

METHOD AND CONTROL DEVICE FOR CONTROLLING DRIVING OPERATION OF AN ARTICULATED TRACKED VEHICLE

TECHNICAL FIELD

5 The invention relates to a method performed by a control device for controlling driving operation of an articulated tracked vehicle. The invention also relates to a control device for controlling driving operation of an articulated tracked vehicle. The invention also relates to an articulated tracked vehicle. The invention in addition relates to a computer program and a computer readable
10 medium.

BACKGROUND ART

Articulated tracked vehicles may advantageously be used for driving in terrain. Such articulated tracked vehicles comprise a drive arrangement for operating
15 the vehicle. The drive arrangement may be any suitable drive arrangement such as an internal combustion engine for operating the vehicle, an electrical drive arrangement for electrically operating the vehicle or a hybrid drive arrangement for hybrid operation of the vehicle. Such an articulated tracked vehicle comprises a front vehicle unit and a rear vehicle unit steerably
20 connected to the front vehicle unit by means of a steering device for mutually pivoting said vehicle units. The mutual pivoting may comprise pivoting about different axis. The mutual pivoting may comprise pivoting about a steering axis, the steering device comprising a steering arrangement for said steering. The mutual pivoting may comprise pivoting about a roll axis, the steering device
25 comprising a roll arrangement for said roll movement. The mutual pivoting may comprise tilting about a tilt axis, the steering device comprising a tilt arrangement for tilt movement.

When driving such articulated tracked vehicle the operator of the vehicle may change the angle of the horizontal plane between the front and rear vehicle units by means of a steering wheel. However, operation of such vehicle may be difficult e.g. when driving on slippery surface, where the risk of the articulated tracked vehicle skidding and slipping is substantial. This may result in accidents.

There is thus a need for improving controlling driving operation of such an articulated tracked vehicle.

10 OBJECTS OF THE INVENTION

An object of the present invention is to provide a method performed by a control device for controlling driving operation of an articulated tracked vehicle.

Another object of the present invention is to provide a control device for controlling driving operation of an articulated tracked vehicle.

15 Another object of the present invention is to provide an articulated tracked vehicle comprising such a control device.

SUMMARY

20 These and other objects, apparent from the following description, are achieved by a method, a control device, an articulated tracked vehicle, a computer program and a computer readable medium, as set out in the appended independent claims. Preferred embodiments of the method and the control device are defined in appended dependent claims.

25 A method performed by a control device for controlling driving operation of an articulated tracked vehicle. Said articulated tracked vehicle comprises a drive arrangement for driving drive wheels for operating the vehicle. The articulated

tracked vehicle comprises a first vehicle unit and a second vehicle unit steerably connected to the first vehicle unit by means of a steering device for mutually pivoting said vehicle units. The mutual pivoting comprises steering movement about a steering axis. The steering device comprises a steering arrangement for said steering movement. The method comprises the steps of:

5 controlling the steering arrangement of the steering device so as to control mutual steering movement of said vehicle units for dynamic stability control. Hereby safety during drive of the vehicle is improved in that the risk of skidding and slipping may be reduced. According to an aspect of the present disclosure,

10 said steering arrangement comprises steering cylinders for facilitating said steering movement about said steering axis. According to an aspect of the present disclosure, the steps of: controlling the steering arrangement of the steering device so as to control mutual steering movement of said vehicle units for dynamic stability control is configured to be performed during drive of the

15 vehicle. According to an aspect of the present disclosure, the step of controlling the steering arrangement of the steering device is configured to be performed so as to reduce the risk of skidding and/or slipping for dynamic stability control.

According to an embodiment of the method, the step of controlling the steering arrangement is performed by means of a control arrangement. Hereby the

20 mutual steering movement of said vehicle units may be efficiently controlled for providing dynamic stability control of the articulated tracked vehicle. The controlling of the steering arrangement by means of a control arrangement may comprise providing control functions on the steering arrangement. The steering arrangement may comprise a pivotable steering shaft on which the

25 control arrangement may act, the steering shaft providing said steering axis. The steering arrangement may comprise steering cylinders on which the control arrangement may act for controlling the steering arrangement. According to an aspect of the present disclosure, the step of controlling the steering arrangement by means of said control arrangement comprises acting

30 on said steering cylinders by means of said control arrangement. According to an aspect of the present disclosure, the step of controlling the steering

arrangement by means of said control arrangement comprises acting on said steering shaft by means of said control arrangement.

According to an embodiment of the method the step of controlling the steering arrangement by means of the control arrangement comprises providing a
5 brake function and/or a locking function and/or a damping function and/or an actuation function of the control arrangement. Hereby the mutual steering movement of said vehicle units may be efficiently controlled for providing dynamic stability control of the articulated tracked vehicle. The step of controlling the steering arrangement by means of the control arrangement may
10 comprise providing a brake function by means of a brake member acting on the steering arrangement. The step of controlling the steering arrangement by means of the control arrangement may comprise providing a locking function by means of a locking member acting on the steering arrangement. The step of controlling the steering arrangement by means of the control arrangement
15 may comprise providing a damping function by means of a damping member acting on the steering arrangement. The step of controlling the steering arrangement by means of the control arrangement may comprise providing an actuation function by means of an actuation member acting on the steering arrangement. The control arrangement may be configured to act on existing
20 manoeuvre units of the steering device such as e.g. hydraulic steering cylinders. The control arrangement may comprise an electric motor and/or a hydraulic motor configured to act on the steering arrangement. The step of controlling the roll arrangement may be performed by means of an electric motor and/or a hydraulic motor configured to act on steering cylinders of the
25 steering arrangement. The control arrangement may comprise a hydraulic cylinder or actuator configured to be comprised in the steering device, wherein braking, damping, locking and/or actuation function may be integrated in such a hydraulic cylinder or actuator.

According to an embodiment of the method the step of controlling mutual
30 steering movement of said vehicle units further comprises controlling one or

more of: power provision of the drive arrangement; a braking system of the vehicle; and a transmission arrangement of the vehicle. Hereby the mutual steering movement of said vehicle units may be even more efficiently controlled for providing dynamic stability control of the articulated tracked vehicle. Hereby control of the mutual steering movement of said vehicle units by controlling the steering arrangement of the steering device may be more efficiently controlled due to the fact that the control of the steering arrangement may be performed in cooperation with controlling one or more of: power provision of the drive arrangement; a braking system of the vehicle; and a transmission arrangement of the vehicle.

According to an aspect of the present disclosure the step of controlling the steering arrangement of the steering device by means of said control arrangement so as to control mutual steering movement of said vehicle units so as to reduce the risk of skidding and/or slipping for dynamic stability control may be performed based on the steps of controlling one or more of: power provision of the drive arrangement; a braking system of the vehicle; and a transmission arrangement of the vehicle.

According to an aspect of the present disclosure the step of controlling the steering arrangement of the steering device by means of said control arrangement and the steps of controlling one or more of: power provision of the drive arrangement; a braking system of the vehicle; and a transmission arrangement of the vehicle may be cooperatively performed and adapted during drive of the vehicle so as to optimize control of mutual steering movement of said vehicle units so as to reduce the risk of skidding and/or slipping for dynamic stability control.

According to an aspect of the present disclosure the steps of controlling one or more of: power provision of the drive arrangement; a braking system of the vehicle; and a transmission arrangement of the vehicle so as to control mutual steering movement of said vehicle units so as to reduce the risk of skidding and/or slipping for dynamic stability control may be performed based on the

step of controlling the steering arrangement of the steering device by means of said control arrangement.

According to an embodiment of the method the step of controlling mutual steering movement of said vehicle units is performed based on one or more of: steering angle between said vehicle units; power of said drive arrangement; speed of drive wheels; speed of transmission; steering wheel angle of steering wheel of vehicle. By thus controlling mutual steering movement of said vehicle units based on such information, dynamic stability control for avoidance of skidding and slipping may be efficiently obtained. The method may comprise the step of determining one or more of: steering angle between said vehicle units; power of said drive arrangement; speed of drive wheels; speed of transmission; steering wheel angle of steering wheel of vehicle. The method may comprise the step of comparing steering angle between said vehicle units and steering wheel angle of steering wheel of vehicle. The method may comprise the step of controlling mutual steering movement of said vehicle units so that power provision of the drive arrangement is reduced/cancelled out and/or steering angle movement of steering arrangement is provided with a braking/locking/damping action by means of the control arrangement and/or track of one or more track assemblies are provided with a brake action by means of the braking system of the vehicle if the steering angle is changed relative to the steering wheel angle of the vehicle. The method may comprise the step of receiving information about one or more of: steering angle between said vehicle units from steering angle determination device; power of said drive arrangement from power determination device; speed of drive wheels from drive wheel speed determination device; speed of transmission from transmission speed determination device; steering wheel angle of steering wheel of vehicle from steering wheel angle determination device.

The method may comprise the step of determining skidding and/or slipping of leading vehicle unit and/or trailing vehicle unit and/or entire articulated tracked vehicle. The method may further comprise the step of activating control of the

steering arrangement of the steering device so as to control mutual steering movement of said vehicle units for dynamic stability control based on the thus determined skidding and/or slipping. The step of activating control of the steering arrangement based on the thus determined skidding and/or slipping
5 may comprise controlling power provision of the drive arrangement and/or the braking system of the vehicle by activating one or more brakes of the braking system so as to brake one or more tracks of the track assemblies of the vehicle.

The method may comprise the step of determining the configuration of the
10 ground on which the vehicle is driving comprising determining whether the ground is slippery. The method may further comprise the step of activating control of the steering arrangement of the steering device so as to control mutual steering movement of said vehicle units for dynamic stability control based on the thus determined configuration of the ground. The step of
15 activating control of the steering arrangement based on the thus determined configuration of the ground may comprise controlling power provision of the drive arrangement and/or the braking system of the vehicle by activating one or more brakes of the braking system so as to brake one or more tracks of the track assemblies of the vehicle.

20 For an articulated tracked vehicle having a steering device with a steering arrangement being provided with a hydraulic overflow function for preventing forces in the steering device to exceed a certain threshold, which may be activated during drive on bumpy and/or slippery ground resulting in uncontrolled skidding/slipping of the vehicle, the method may further comprise
25 the step of activating control of the steering arrangement of the steering device so as to control mutual steering movement of said vehicle units for dynamic stability control based on the thus determined hydraulic overflow so as to prevent uncontrolled skidding/slipping. The step of activating control of the steering arrangement based on the thus determined hydraulic overflow may
30 comprise controlling power provision of the drive arrangement and/or the

braking system of the vehicle by activating one or more brakes of the braking system so as to brake one or more tracks of the track assemblies of the vehicle so as to prevent uncontrolled skidding/slipping.

5 A control device for controlling driving operation of an articulated tracked vehicle. Said articulated tracked vehicle comprises a drive arrangement for driving drive wheels for operating the vehicle. The articulated tracked vehicle comprises a first vehicle unit and a second vehicle unit steerably connected to the first vehicle unit by means of a steering device for mutually pivoting said vehicle units. The mutual pivoting comprises steering movement about a
10 steering axis. The steering device comprises a steering arrangement for said steering movement. The control device is configured to: control the steering arrangement of the steering device so as to control mutual steering movement of said vehicle units for dynamic stability control.

15 According to an embodiment the control device is configured to control the steering arrangement by means of a control arrangement.

According to an embodiment of the control device, the control arrangement comprises a brake member for providing a brake function and/or a locking member for providing a locking function and/or a damping member for providing a damping function and/or an actuator member for providing an
20 actuation function.

According to an embodiment, the control device, when controlling mutual steering movement of said vehicle units, further being configured to control one or more of: power provision of the drive arrangement; a braking system of the vehicle; and a transmission arrangement of the vehicle.

25 According to an embodiment, the control device, when controlling mutual steering movement of said vehicle units, is configured to perform said control based on one or more of: steering angle between said vehicle units; power of said drive arrangement; speed of drive wheels; speed of transmission; steering wheel angle of steering wheel of vehicle.

The control device according to the present disclosure has the advantages according to the corresponding method as set out herein.

Specifically an object of the invention is achieved by an articulated tracked vehicle comprising a control device as set out herein.

- 5 Specifically an object of the invention is achieved by a computer program for controlling steering of a vehicle, said computer program comprising program code which, when run on a control device or another computer connected to the control device, causes the control device to perform the method steps as set out herein.
- 10 Specifically an object of the invention is achieved by a computer readable medium comprising instructions which, when executed by a computer, cause the computer to carry out the method as set out herein.

BRIEF DESCRIPTION OF THE DRAWINGS

- 15 For a better understanding of the present invention reference is made to the following detailed description when read in conjunction with the accompanying drawings, wherein like reference characters refer to like parts throughout the several views, and in which:

Fig. 1a schematically illustrates a side view of an articulated tracked vehicle
20 according to an embodiment of the present disclosure;

Fig. 1b schematically illustrates a plan view of the articulated tracked vehicle in fig. 1a according to an embodiment of the present disclosure;

Fig. 2a schematically illustrates a side view of a steering device according to an embodiment of the present disclosure;

- 25 Fig. 2b schematically illustrates a side plan view of the steering device in fig. 2a according to an embodiment of the present disclosure;

Fig. 3a schematically illustrates a side view of a portion of the articulated tracked vehicle in fig. 1a with the steering device in fig. 2a according to an embodiment of the present disclosure;

Fig. 3b schematically illustrates a perspective view of the steering device in fig.
5 2a according to an embodiment of the present disclosure;

Fig. 4a schematically illustrates a plan view of an articulated tracked vehicle equipped with sensors for providing basis for controlling driving operation of the vehicle according to an embodiment of the present disclosure;

Fig. 4b schematically illustrates a plan view of the articulated tracked vehicle
10 in fig. 4a equipped with control members for controlling driving operation of the vehicle according to an embodiment of the present disclosure;

Fig. 5 schematically illustrates a block diagram of a control device for controlling steering of an articulated tracked vehicle according to an embodiment of the present disclosure;

Fig. 6 schematically illustrates a flowchart of a method performed by a control
15 device for controlling steering of a an articulated tracked vehicle according to an embodiment of the present disclosure;

Fig. 7 schematically illustrates a flowchart of a method performed by a control
20 device for controlling steering of an articulated tracked vehicle according to an embodiment of the present disclosure; and

Fig. 8 schematically illustrates a computer according to an embodiment of the present invention.

DETAILED DESCRIPTION

25 Hereinafter the term “link” refers to a communication link which may be a physical connector, such as an optoelectronic communication wire, or a non-

physical connector such as a wireless connection, for example a radio or microwave link.

Fig. 1a schematically illustrates a side view of an articulated tracked vehicle V according to an embodiment of the present disclosure and fig. 1b. 5 schematically illustrates a plan view of the articulated tracked vehicle in fig. 1a. The articulated tracked vehicle V comprises a first vehicle unit V1 and a second vehicle unit V2 steerably connected to the first vehicle unit by means of a steering device D for mutually pivoting the vehicle units V1, V2 of the articulated tracked vehicle V. The first vehicle unit V1 is here the leading 10 vehicle unit, i.e. the front vehicle unit. The second vehicle unit V2 is here the trailing vehicle unit, i.e. the rear vehicle unit.

The first vehicle unit V1 comprises a track assembly pair. The track assembly pair comprises a left track assembly TA1 and a right track assembly for driving the first vehicle unit V1, the left track assembly TA1 being shown in fig. 1a. 15 The second vehicle unit V2 comprises a track assembly pair. The track assembly pair comprises a left track assembly TA3 and a right track assembly for driving the second vehicle unit V2, the left track assembly TA3 being shown in fig. 1a.

The first vehicle unit V1 comprises a vehicle body 5, which according to an aspect of the present disclosure may comprise the chassis of the first vehicle 20 unit V1 and bodywork. The track assembly pair of the first vehicle unit V1 may be suspendedly connected to the vehicle body 5. The second vehicle unit V2 comprises a vehicle body 6, which according to an aspect of the present disclosure may comprise the chassis of the second vehicle unit V2 and bodywork. The track assembly pair of the second vehicle unit V2 may be 25 suspendedly connected to the vehicle body 6.

Each track assembly comprises a drive wheel 1, a tension wheel 2, a set of road wheels 3 and an endless track 4 arranged to run over said wheels. Here the drive wheel 1 is arranged in the front, the tension wheel 2 is arranged in the back and the road wheels 3 are arranged between the drive wheel 1 and

the tension wheel 2. The articulated tracked vehicle V according to the present disclosure may however have track assemblies with any suitable arrangement of drive wheel, tension wheel and road wheels.

5 The exemplified articulated tracked vehicle may be operated in any suitable way. The exemplified vehicle may be operated by means of an internal combustion engine. The exemplified vehicle may be an electrically operated vehicle. The exemplified vehicle may be diesel electrically operated. The exemplified articulated tracked vehicle may be a hybrid articulated tracked vehicle.

10 The exemplified articulated tracked vehicle may comprise any suitable drive arrangement for driving the vehicle. The articulated tracked vehicle V comprises a drive arrangement 120, see fig. 1a.

The articulated tracked vehicle V comprises a steering device D according to the present disclosure. The steering device D is arranged for mutually steering
15 the first and second vehicle units V1, V2 of the articulated tracked vehicle V. The second vehicle unit V2 is thus steerably connected to the first vehicle unit V1 by means of the steering device D for mutually pivoting said vehicle units V1, V2. The first and second vehicle units V1, V2 of the articulated vehicle V are consequently steerably interconnected by means of the steering device D.
20 The mutual pivoting of first and second vehicle units V1, V2 comprises steering movement about a steering axis Y, see fig. 1b. The steering axis Y is provided by the steering device D. In fig. 1b the first vehicle unit V1 and second vehicle unit V2 are mutually pivoted an angle α relative to each other.

A control device 100 for controlling driving operation of the articulated tracked
25 vehicle V is provided. The control device 100 is according to an embodiment comprised in the articulated tracked vehicle V. The articulated tracked vehicle V comprises, according to an embodiment, a control device 100 for controlling driving operation of an articulated tracked vehicle according to fig. 5.

The articulated tracked vehicle V is, according to an embodiment, arranged to be operated in accordance with a method M1 for controlling driving operation of an articulated tracked vehicle according to fig. 6.

5 The articulated tracked vehicle V is, according to an embodiment, arranged to be operated in accordance with a method M2 for controlling driving operation of an articulated tracked vehicle according to fig. 7.

Fig. 2a schematically illustrates a side view of a steering device according to an embodiment of the present disclosure, fig. 2b schematically illustrates a plan view of the steering device in fig. 2a, fig. 3a schematically illustrates a side view of a portion of the articulated tracked V vehicle in fig. 1a with the steering device D, and fig. 3b schematically illustrates a perspective view of the steering device in fig. 2a.

10 The steering device D is configured to steerably interconnect a first vehicle unit and a second vehicle unit of an articulated tracked vehicle, e.g. an articulated tracked vehicle according to fig. 1a-b, for mutually pivoting the first vehicle unit and the second vehicle unit.

The steering device D has a longitudinal extension corresponding to the longitudinal extension of the vehicle units V1, V2 of the articulated tracked vehicle V, see fig. 1a and 3a.

20 The steering device D comprises a front fastening member 12 arranged to be assembled at the first vehicle unit, i.e. the front vehicle unit. The front fastening member 12 is intended to be arranged in connection to the rear end of the front vehicle unit V1 of the articulated tracked vehicle, see also fig. 1a and 3a.

25 The front fastening member 12 is intended for fixed non-rotational assembling at the rear end of the front vehicle unit V1 of the articulated tracked vehicle, see also fig. 1a. The fastening member 12 comprises a number of fasteners 12a, 12b, 12c, 12d for assembling the steering device D to a rear portion of the front vehicle unit.

The steering device D comprises a rear fastening member 14 arranged to be assembled at the second vehicle unit, i.e. the rear vehicle unit. The rear fastening member 14 is intended to be arranged in connection to the front end of the rear vehicle unit V2 of the articulated tracked vehicle V, see also fig. 1a and 3a. The rear fastening member 14 is thus intended for assembling at the front end of the rear vehicle unit.

The rear fastening member 14 is intended for fixed non-rotational assembling at the front end of the rear vehicle unit V2 of the articulated tracked vehicle, see also fig. 1a and 3a. The fastening member 14 comprises a number of fasteners 14a, 14b, 14c, 14d, 14e, 14f for assembling the steering device to a front portion of the rear vehicle unit.

The steering device D further comprises a front steering link 16. The front steering link 16 is pivotably connected to said front fastening member 12 about a front tilt axis Z1 running in the transversal direction relative to the longitudinal extension of the steering device D. The front tilt axis is Z1 is running in the transversal direction of the front vehicle unit when the steering device D is connected to the front vehicle unit. The front steering link 16 is pivotably connected to said front fastening member 12 about a front tilt shaft configuration T1 for pivotable movement about the front tilt axis Z1 so as to facilitate tilt movement of the front vehicle unit of the articulated tracked vehicle relative to the front steering link 16.

The steering device D further comprises a rear steering link 18. The rear steering link 18 is rotatably connected to said rear fastening member 14 about a roll axis X running in the longitudinal direction of the rear vehicle unit, when the steering device D is connected to the rear vehicle unit. The rear steering link 18 is, according to this example, rotatably connected to said rear fastening member 14 about the roll axis X via a rotation member R configured to facilitate rotatable movement of the rear steering member 14 relative to the rear steering link 18. The rotation member R is, according to this example, rotatably journaled in bearings for facilitating the rotational movement of the rear

steering member 14 relative to the rear steering link 18 about the roll axis X. The rear steering link 18 is thus rotatably connected to said rear fastening member 14 so as to allow rotation of the front vehicle unit relative to the rear vehicle unit about the roll axis X. Thus, hereby different side inclination
5 positions of the front vehicle unit relative to the rear vehicle units is facilitated. The rotation member R may be comprised in a roll arrangement A2. The rotation member R, rear fastening member 14 and rear steering link 18 may be comprised in the roll arrangement A2. The steering device D may thus comprise a roll arrangement A2 comprising the rotation member R, rear
10 fastening member 14 and rear steering link 18.

The rear steering link 18 is pivotably connected to said rear fastening member 14 about a rear tilt axis Z2 running in the transversal direction relative to the longitudinal extension of the steering device D. The rear tilt axis is Z2 running in the transversal direction of the rear vehicle unit when the steering device D
15 is connected to the rear vehicle unit. The rear steering link 18 is pivotably connected to said rear fastening member 14 about a rear tilt shaft configuration T2 for pivotable movement about the rear tilt axis Z2 so as to facilitate tilt movement of the rear vehicle unit of the articulated tracked vehicle relative to the rear steering link 18.

20 The front steering link 16 and rear steering link 18 are pivotably connected about a steering axis Y running in the vertical direction relative to the longitudinal extension of the steering device D. The front steering link 16 and rear steering link 18 are pivotably about a steering shaft S. The front and rear steering link 16, 18 are forming a steering link unit. The steering device D thus
25 comprises an essentially vertical steering shaft S about which the vehicle units are pivotable when connected to the steering device D.

The front fastening member 12, rear fastening member 14, front steering link 16 and rear steering link 18 may be comprised in a steering member 10. The steering device D may thus comprise a steering member 10 for facilitating
30 mutual pivoting about the steering axis Y. The steering device D may thus

comprise a steering member 10 comprising the front fastening member 12, rear fastening member 14, front steering link 16 and rear steering link 18.

The steering device D further comprises a front tilt cylinder unit 22 arranged in the upper front portion of the steering device D in connection to the front fastening member 12. The front tilt cylinder unit 22 comprises a cylinder part 22a and a piston rod part 22b. The front tilt cylinder unit 22 is according to an embodiment a hydraulic tilt cylinder unit 22. The front cylinder unit 22 is configured to run in the longitudinal extension of the steering device D. The front cylinder unit 22 is configured to run in the longitudinal extension of the front vehicle unit when the steering device D is connected to the front vehicle unit.

The steering device D further comprises a rear tilt cylinder unit 24 arranged in the upper front portion of the steering device D in connection to the rear fastening member 14. The rear tilt cylinder unit 24 comprises a cylinder part 24a and a piston rod part 24b. The rear tilt cylinder unit 24 is according to an embodiment a hydraulic tilt cylinder unit 24. The rear cylinder unit 24 is configured to run in the longitudinal extension of the steering device D. The rear cylinder unit 24 is configured to run in the longitudinal extension of the rear vehicle unit when the steering device D is connected to the rear vehicle unit.

The front cylinder unit 22 is pivotably connected to the upper portion of the front fastening member 12 about an upper front tilt axis Z3. The upper front tilt axis Z3 is running in the transversal direction relative to the longitudinal extension of the steering device D. The upper front tilt axis is Z3 is running in the transversal direction of the front vehicle unit when the steering device D is connected to the front vehicle unit. The front cylinder unit 22 is pivotably connected to the upper portion of the front fastening member 12 about an upper front tilt shaft configuration T3 for pivotable movement about the upper front tilt axis Z3 so as to facilitate tilt movement of the front vehicle unit of the articulated tracked vehicle relative to the front cylinder unit 22.

The piston rod part 22b of the front cylinder unit 22 is pivotably connected to the steering link unit, i.e. to the steering shaft S, so that the front cylinder unit 22 is pivotable about the steering axis Y.

5 The rear cylinder unit 24 is pivotably connected to the upper portion of the rear fastening member 14 about an upper rear tilt axis Z4. The upper rear tilt axis Z4 is running in the transversal direction relative to the longitudinal extension of the steering device D. The rear cylinder unit 24 is pivotably connected to the upper portion of the rear fastening member 14 about an upper rear tilt shaft configuration T4 for pivotable movement about the upper rear tilt axis Z4 so as
10 to facilitate tilt movement of the rear vehicle unit of the articulated tracked vehicle relative to the rear cylinder unit 24.

The piston rod part 24b of the rear cylinder unit 24 is pivotably connected to the steering link unit, i.e. to the steering shaft S, so that the rear cylinder unit 24 is pivotable about the steering axis Y.

15 The steering device D further comprises a first steering cylinder unit 30 arranged in the lower part of the steering device D along the left side of the steering device. The first steering cylinder unit 30 comprises a cylinder part 30a and a piston rod part 30b. The first steering cylinder unit 30 is according to an embodiment a hydraulic steering cylinder unit 30. The first steering
20 cylinder unit 30 is configured to run in the longitudinal extension of the steering device D. See fig. 3b.

The cylinder part 30a of the a first steering cylinder unit 30 is pivotably connected to the front steering link 16 about a front left steering axis Y1 running in the vertical direction on the front left side of the steering device D. The
25 cylinder part 30a of the first steering cylinder unit 30 is pivotably connected to the front steering link 16 about a front left steering shaft configuration S1 for pivotable movement about the front left steering axis Y1 so as to facilitate mutual pivoting of the front vehicle unit and rear vehicle unit of the articulated tracked vehicle about the steering axis Y. See fig. 3b.

The piston rod part 30b of the first steering cylinder unit 30 is pivotably connected to the rear steering link 18 about a rear left steering axis Y2 on the rear left side of the steering device D. The piston rod part 30b of the first steering cylinder unit 30 is pivotably connected to the rear steering link 18
5 about a rear left steering shaft configuration S2 for pivotable movement about the rear left steering axis Y2 so as to facilitate mutual pivoting of the front vehicle unit and rear vehicle unit of the articulated tracked vehicle about the steering axis Y. See fig. 3b.

The steering device D further comprises a second steering cylinder unit 32
10 arranged in the lower part of the steering device D along the right side of the steering device. The second steering cylinder unit 32 comprises a cylinder part 32a and a piston rod part 32b. The second steering cylinder unit 32 is according to an embodiment a hydraulic steering cylinder unit 32. The second steering cylinder unit 32 is configured to run in the longitudinal extension of the
15 steering device D. See fig. 2a.

The cylinder part 32a of the a second steering cylinder unit 32 is pivotably connected to the front steering link 16 about a front right steering axis Y3 running in the vertical direction on the front right side of the steering device D. The cylinder part 32a of the second steering cylinder unit 32 is pivotably
20 connected to the front steering link 16 about a front right steering shaft configuration S1 for pivotable movement about the front right steering axis Y3 so as to facilitate mutual pivoting of the front vehicle unit and rear vehicle unit of the articulated tracked vehicle about the steering axis Y. See fig. 2a.

The piston rod part 32b of the second steering cylinder unit 32 is pivotably
25 connected to the rear steering link 18 about a rear right steering axis Y4 on the rear right side of the steering device D. The piston rod part 32b of the second steering cylinder unit 32 is pivotably connected to the rear steering link 18 about a rear right steering shaft configuration S2 for pivotable movement about the rear right steering axis Y4 so as to facilitate mutual pivoting of the front

vehicle unit and rear vehicle unit of the articulated tracked vehicle about the steering axis Y. See fig. 2a.

The steering member 10 and first steering cylinder unit 30 and second steering cylinder unit 32 may be comprised in a steering arrangement A1. The steering device D may thus comprise a steering arrangement A1 for facilitating the steering movement about the steering axis Y. The steering device D may thus comprise a steering arrangement A1 comprising steering member 10 comprising the front fastening member 12, rear fastening member 14, front steering link 16, rear steering link 18, the first steering cylinder unit 30 and second steering cylinder unit 32.

The steering device D may comprise a protective housing, not shown, arranged to surround and protect parts of the steering device D.

Fig. 4a schematically illustrates a plan view of an articulated tracked vehicle V equipped with sensors for providing basis for controlling driving operation of the vehicle V according to an embodiment of the present disclosure. Fig. 4b schematically illustrates a plan view of the articulated tracked vehicle V in fig. 4a equipped with control members for controlling driving operation of the vehicle according to an embodiment of the present disclosure.

The articulated tracked vehicle V comprises a first vehicle unit V1 and a second vehicle unit V2 steerably connected to the first vehicle unit by means of a steering device D for mutually pivoting the vehicle units V1, V2 of the articulated tracked vehicle V. The mutual pivoting comprises steering movement about a steering axis. The steering device D comprises a steering arrangement A1 for the steering movement. The first vehicle unit V1 is here the leading vehicle unit and the second vehicle unit V2 is here the trailing vehicle unit.

The first vehicle unit V1 comprises a track assembly pair TA1, TA2, comprising a left track assembly TA1 and a right track assembly TA2 for driving the first vehicle unit V1. The second vehicle unit V2 comprises a track assembly pair

TA3, TA4 comprising a left track assembly TA3 and a right track assembly TA4 for driving the second vehicle unit V2.

The first vehicle unit V1 comprises a vehicle body 5/vehicle chassis 5. The track assembly pair TA1, TA2 of the first vehicle unit V1 may be suspendedly
5 connected to the vehicle body 5. The second vehicle unit V2 comprises a vehicle body 6/vehicle chassis. The track assembly pair TA3, TA4 of the second vehicle unit V2 may be suspendedly connected to the vehicle body 6.

Each track assembly comprises a drive wheel 1. Each track assembly may further comprise a tension wheel and a set of road wheels, not shown, and an
10 endless track 4 arranged to run over said wheels.

Said articulated tracked vehicle V comprises a drive arrangement 120 for driving the drive wheels 1 for operating the vehicle V. The mutual pivoting comprises steering movement about a steering axis of the steering arrangement A1.

15 Said articulated tracked vehicle V comprises a brake system 130 for braking the drive wheels 1 of the vehicle V.

Said articulated tracked vehicle V comprises a transmission arrangement 140 for providing gear shift of the drive wheels 1 during operation of the vehicle V.

Said articulated tracked vehicle V comprises a control device 100 for
20 controlling driving operation of the articulated tracked vehicle V. The control device 100 is configured to control the steering arrangement A1 of the steering device so as to control mutual steering movement of said vehicle units V1, V2 for dynamic stability control.

As shown in fig. 4a, the articulated tracked vehicle V may comprise a steering
25 angle determination device 150 for determining the steering angle between said vehicle units V1, V2. The steering angle determination device 150 may comprise one or more angle sensors for determining the steering angle between said vehicle units V1, V2. The control device 100 may be arranged to

receive information about steering angle between said vehicle units V1, V2 from the steering angle determination device 150.

As shown in fig. 4a, the articulated tracked vehicle V may comprise a drive arrangement power determination device 160 for determining power of said drive arrangement 120. The control device 100 may be arranged to receive
5 information about power of said drive arrangement 120 from the drive arrangement power determination device 160.

As shown in fig. 4a, the articulated tracked vehicle V may comprise a drive wheel speed determination device 170 for determining speed of the drive
10 wheels 1 of the articulated tracked vehicle V. The wheel speed determination device 170 may comprise one or more wheel sensors arranged in connection to drive wheels 1. The control device 100 may be arranged to receive information about speed of the drive wheels 1 from the wheel speed determination device 170.

As shown in fig. 4a, the articulated tracked vehicle V may comprise a transmission speed determination device 180 for determining speed of transmission of the transmission arrangement 140 of the articulated tracked vehicle V. The transmission speed determination device 180 may comprise one or more sensors arranged in connection to the transmission arrangement
20 140 of the articulated tracked vehicle so as to detect the transmission speed. The control device 100 may be arranged to receive information about speed of transmission of the transmission arrangement 140 from the transmission speed determination device 180.

As shown in fig. 4a, the articulated tracked vehicle V may comprise a steering wheel angle determination device 190 for determining steering wheel angle of steering wheel of the articulated tracked vehicle. The a steering wheel angle determination device 190 may comprise one or more sensors arranged in connection to the steering wheel of the articulated tracked vehicle so as to detect the steering wheel angle. The control device 100 may be arranged to
25

receive information about steering wheel angle of steering wheel from the steering wheel angle determination device 190.

As shown in fig. 4b, the control device 100 is configured to control the steering arrangement A1 by means of the control arrangement 110 so as to control mutual steering movement of said vehicle units for dynamic stability control. The control arrangement 110 may comprise a brake member for providing a brake function on the steering arrangement A1 and/or a locking member for providing a locking function on the steering arrangement A1 and/or a damping member for providing an damping function on the steering arrangement A1 and/or an actuator member for providing an actuation function on the steering arrangement A1.

The control arrangement 110 may be configured to act on existing manoeuvre units of the steering device such as e.g. hydraulic steering cylinders. The control arrangement 110 may comprise an electric motor and/or a hydraulic motor configured to act on the steering arrangement A1. The steering arrangement A1 may be controlled by means of an electric motor and/or a hydraulic motor configured to act on steering cylinders of the steering arrangement. The control arrangement 110 may comprise a hydraulic cylinder or actuator configured to be comprised in the steering device, wherein braking, damping, locking and/or actuation function may be integrated in such a hydraulic cylinder or actuator.

According to an aspect of the present disclosure, the control device 100, when controlling mutual steering movement of said vehicle units V1, V2 by controlling the control arrangement 110, may be configured to perform said control based on one or more of: determined steering angle between said vehicle units; determined power of said driving arrangement 120; determined speed of drive wheels 1; determined transmission speed of transmission arrangement 140; and determined steering wheel angle of steering wheel of vehicle V.

As shown in fig. 4b, the control device 100 may be configured to control the power provision of the drive arrangement 120 so as to further facilitate controlling mutual steering movement of said vehicle units V1, V2 for dynamic stability control. The control of power provision the drive arrangement 120 may
5 be performed by means of a power provision control member 122 controlled by the control device 100.

According to an aspect of the present disclosure, the control device 100, when controlling mutual steering movement of said vehicle units V1, V2 by controlling the power provision of the drive arrangement 120, may be
10 configured to perform said control based on one or more of: determined steering angle between said vehicle units; determined power of said driving arrangement 120; determined speed of drive wheels 1; determined transmission speed of transmission arrangement 140; and determined steering wheel angle of steering wheel of vehicle V. According to an aspect of
15 the present disclosure, the control device 100, when controlling mutual steering movement of said vehicle units V1, V2 by controlling the power provision of the drive arrangement 120, may be configured to perform said control based on and/or considering said control of the mutual steering movement of said vehicle units V1, V2 by controlling said steering
20 arrangement A1 by means of said control arrangement 110.

As shown in fig. 4b, the control device 100 may be configured to control the braking system 130 of the vehicle V so as to further facilitate controlling mutual steering movement of said vehicle units V1, V2 for dynamic stability control.

According to an aspect of the present disclosure, the control device 100, when
25 controlling mutual steering movement of said vehicle units V1, V2 by controlling the braking system 130, may be configured to perform said control based on one or more of: determined steering angle between said vehicle units; determined power of said driving arrangement 120; determined speed of drive wheels 1; determined transmission speed of transmission
30 arrangement 140; and determined steering wheel angle of steering wheel of

vehicle V. According to an aspect of the present disclosure, the control device 100, when controlling mutual steering movement of said vehicle units V1, V2 by controlling the braking system 130, may be configured to perform said control based on and/or considering said control of the mutual steering movement of said vehicle units V1, V2 by controlling said steering arrangement A1 by means of said control arrangement 110.

As shown in fig. 4b, the control device 100 may be configured to control the transmission speed of the transmission arrangement 140 so as to further facilitate controlling mutual steering movement of said vehicle units V1, V2 for dynamic stability control.

According to an aspect of the present disclosure, the control device 100, when controlling mutual steering movement of said vehicle units V1, V2 by controlling the transmission speed of the transmission arrangement 140, may be configured to perform said control based on one or more of: determined steering angle between said vehicle units; determined power of said driving arrangement 120; determined speed of drive wheels 1; determined transmission speed of transmission arrangement 140; and determined steering wheel angle of steering wheel of vehicle V. According to an aspect of the present disclosure, the control device 100, when controlling mutual steering movement of said vehicle units V1, V2 by controlling the transmission speed of the transmission arrangement 140, may be configured to perform said control based on and/or considering said control of the mutual steering movement of said vehicle units V1, V2 by controlling said steering arrangement A1 by means of said control arrangement 110.

According to an aspect of the present disclosure, the control device 100, when controlling mutual steering movement of said vehicle units V1, V2 by controlling said steering arrangement A1 by means of said control arrangement 110 so as to reduce the risk of skidding and/or slipping for dynamic stability control may be configured to perform said control based on and/or considering said control of the mutual steering movement of said

vehicle units V1, V2 by means of one or more of: power provision of the drive arrangement 120; said braking system 130 of the vehicle; and said transmission arrangement 140 of the vehicle.

According to an aspect of the present disclosure, the control device 100, when
5 controlling the steering arrangement A1 of the steering device D by means of said control arrangement 110 and controlling one or more of: power provision of the drive arrangement 120; said braking system 130 of the vehicle; and said transmission arrangement 140 of the vehicle may be configured to cooperatively perform and adapt said control during drive of the vehicle so as
10 to optimize control of mutual steering movement of said vehicle units so as to reduce the risk of skidding and/or slipping for dynamic stability control.

According to an aspect of the present disclosure, the control device 100, when controlling one or more of: power provision of the drive arrangement 120; said braking system 130 of the vehicle; and said transmission arrangement 140 of
15 the vehicle so as to control mutual steering movement of said vehicle units so as to reduce the risk of skidding and/or slipping for dynamic stability control, may be configured to perform said control based on and/or considering said control of said steering arrangement A1 of the steering device by means of said control arrangement 110.

20 Fig. 5 schematically illustrates a block diagram of a control device 100 for controlling driving operation of an articulated tracked vehicle according to an embodiment of the present disclosure.

Said articulated tracked vehicle comprises a drive arrangement for driving drive wheels for operating the vehicle. The articulated tracked vehicle
25 comprises a first vehicle unit and a second vehicle unit steerably connected to the first vehicle unit by means of a steering device for mutually pivoting said vehicle units. The mutual pivoting comprises steering movement about a steering axis. The steering device comprises a steering arrangement for said steering movement. The steering device may be any suitable steering device

with a steering axis for providing mutual pivoting of the vehicle units comprising steering movement about the steering axis. The steering device may be a steering device as described with reference to fig. 2a-b, 3a-b. The steering arrangement of the steering device may be any suitable steering arrangement having taps, shafts and steering cylinder units. The steering arrangement may be a steering arrangement described with reference to fig. 2a-b, 3a-b.

The control device 100 is configured to control driving operation of an articulated tracked vehicle during operation of the vehicle.

The control device 100 for controlling driving operation of an articulated tracked vehicle may be comprised in a system I for controlling driving operation of an articulated tracked vehicle.

The control device 100 may be implemented as a separate entity or distributed in two or more physical entities. The control device 100 may comprise one or more computers. The control device 100 may thus be implemented or realised by the control device comprising a processor and a memory, the memory comprising instructions, which when executed by the processor causes the control device to perform the herein disclosed method.

The control device 100 may comprise one or more electronic control units, processing units, computers, server units or the like for controlling driving operation of an articulated tracked vehicle during operation of the vehicle. The control device 100 may comprise control device such as one or more electronic control units arranged on board a vehicle. The control device 100 may comprise one or more electronic control units of the vehicle.

The control device 100 may as mentioned comprise at least one processing unit. Processing unit may according to an aspect be denoted as processor. The control device 100 may comprise at least one processor. Said at least one processor may include any physical device having an electric circuit that performs logic operations on input data. For example, the at least one processor may include one or more integrated circuits, microchips,

microcontrollers, microprocessors, all or part of a central processing unit (CPU), digital signal processor (DSP), field-programmable gate array (FPGA), or other circuits for executing instructions or performing logic operations.

5 The control device 100 may comprise a random access memory (RAM), a read-only memory (ROM), a hard disk, an optical disk, a magnetic medium, a flash memory or any other mechanism capable of storing instructions or data. The memory may be integrated with or embedded into the at least one processor, or be a separate memory hardware device.

10 According to an aspect of the present disclosure, actions and method steps described herein as being performed by the control device 100 may be performed by said at least one processor upon execution of a computer program stored in said memory.

15 The control device 100 is configured to control the steering arrangement of the steering device so as to control mutual steering movement of said vehicle units for dynamic stability control.

According to an aspect of the present disclosure the control device 100 may be configured to control the steering arrangement by means of a control arrangement 110. According to an aspect of the present disclosure the control arrangement 110 is operably connected to the control device 100.

20 According to an aspect of the present disclosure the system I for controlling driving operation of an articulated tracked vehicle may comprise the control arrangement 110.

25 The control arrangement 110 may comprise a brake member 112 for providing a brake function. The brake member 112 for providing a brake function may be arranged in connection to the steering arrangement so as to provide a braking function of the steering device so as to control mutual steering movement of said vehicle units. The brake member 112 may comprise a mechanically operated brake arranged in connection to the steering

arrangement. The brake member 112 may comprise a hydraulically operated brake arranged in connection to the steering arrangement. The brake member 112 may comprise an electrically operated brake arranged in connection to the steering arrangement. The brake member 112 may be arranged in connection
5 to one or more taps and/or shaft and/or steering cylinder units of the steering arrangement.

The control arrangement 110 may comprise a locking member 114 for providing a locking function. The locking member 114 for providing a locking function may be arranged in connection to the steering arrangement so as to
10 provide a locking function of the steering device so as to control mutual steering movement of said vehicle units. The locking member 114 may comprise a mechanically operated lock arranged in connection to the steering arrangement. The locking member 114 may comprise a hydraulically operated lock arranged in connection to the steering arrangement. The locking member
15 114 may comprise an electrically operated lock arranged in connection to the steering arrangement. The locking member 114 may be arranged in connection to one or more taps and/or shaft and/or steering cylinder units of the steering arrangement.

The control arrangement 110 may comprise a damping member 116 for
20 providing a damping function. The damping member 116 for providing a damping function may be arranged in connection to the steering arrangement so as to provide a damping function of the steering device so as to control mutual steering movement of said vehicle units. The damping member 116 may comprise a mechanically operated damping member arranged in
25 connection to the steering arrangement. The damping member 116 may comprise a hydraulically operated damping member arranged in connection to the steering arrangement. The damping member 116 may comprise an electrically operated damping member arranged in connection to the steering arrangement. The damping member 116 may be arranged in connection to

one or more taps and/or shaft and/or steering cylinder units of the steering arrangement.

The control arrangement 110 may comprise an actuator member 118 for providing an actuation function. The actuation member 118 for providing an
5 actuation function may be arranged in connection to the steering arrangement so as to provide an actuation function of the steering device so as to control mutual steering movement of said vehicle units. The actuation member 118 may comprise a mechanically operated actuation member arranged in connection to the steering arrangement. The actuation member 118 may
10 comprise a hydraulically operated actuation member arranged in connection to the steering arrangement. The actuation member 118 may comprise an electrically operated actuation member arranged in connection to the steering arrangement. The actuation member 118 may be arranged in connection to one or more taps and/or shaft and/or steering cylinder units of the steering
15 arrangement.

The control arrangement 110 may comprise a brake member 112 for providing a brake function and/or locking member 114 for providing a locking function and/or a damping member 116 for providing a damping function and/or an actuator member 118 for providing an actuation function.

20 According to an aspect of the present disclosure, the control device 100, when controlling mutual steering movement of said vehicle units, may further be configured to control one or more of: power provision of the drive arrangement 120 of the vehicle; a braking system 130 of the vehicle; and a transmission arrangement 140 of the vehicle.

25 The control device 100, when controlling mutual steering movement of said vehicle units, may, in addition to the controlling the control arrangement 110, be configured to control power provision of the drive arrangement 120 of the vehicle. The drive arrangement 120 may comprise an internal combustion

engine and/or one or more electric machines for driving the vehicle, i.e. driving the drive wheels of the track assemblies of the vehicle.

The control device 100, when controlling mutual steering movement of said vehicle units, may, in addition to the controlling the control arrangement 110,
5 be configured to control the braking system 130 of the vehicle. The braking system 130 of the vehicle may comprise brake members arranged in connection to the drive wheels of the track assemblies of the vehicle.

The control device 100, when controlling mutual steering movement of said vehicle units, may, in addition to the controlling the control arrangement 110,
10 be configured to control the transmission arrangement 140 of the vehicle 140. The transmission arrangement of the vehicle 140 of the vehicle may comprise any suitable gear arrangement for providing gear shifts of the drive wheels of the track assemblies of the vehicle.

According to an aspect of the present disclosure, the control device 100, when
15 controlling mutual steering movement of said vehicle units, may be configured to perform said control based on one or more of: steering angle between said vehicle units; power of said drive arrangement; speed of drive wheels; speed of transmission; steering wheel angle of steering wheel of vehicle.

The control device 100 may be configured to determine steering angle
20 between said vehicle units as a basis for controlling mutual steering movement of said vehicle units.

According to an aspect of the present disclosure the system I for controlling driving operation of an articulated tracked vehicle may comprise a steering angle determination device 150 for determining the steering angle between
25 said vehicle units. The steering angle determination device 150 may comprise one or more angle sensors for determining the steering angle between said vehicle units. The one or more angle sensors may be arranged in connection to the steering device for determining the steering angle between said vehicle units.

The control device 100 may be configured to determine power of said drive arrangement as a basis for controlling mutual steering movement of said vehicle units.

According to an aspect of the present disclosure the system I for controlling driving operation of an articulated tracked vehicle may comprise a drive arrangement power determination device 160 for determining power of said drive arrangement.

The control device 100 may be configured to determine speed of drive wheels of the articulated tracked vehicle as a basis for controlling mutual steering movement of said vehicle units.

According to an aspect of the present disclosure the system I for controlling driving operation of an articulated tracked vehicle may comprise a drive wheel speed determination device 170 for determining speed of drive wheels of the articulated tracked vehicle. The wheel speed determination device 170 may comprise one or more wheel sensors arranged in connection to drive wheels of the articulated tracked vehicle so as to detect speed of the thus detected drive wheel.

The control device 100 may be configured to determine speed of transmission of the articulated tracked vehicle as a basis for controlling mutual steering movement of said vehicle units.

According to an aspect of the present disclosure the system I for controlling driving operation of an articulated tracked vehicle may comprise a transmission speed determination device 180 for determining speed of transmission of the articulated tracked vehicle. The transmission speed determination device 180 may comprise one or more sensors arranged in connection to transmission of the articulated tracked vehicle so as to detect the transmission speed.

The control device 100 may be configured to determine steering wheel angle of steering wheel of the articulated tracked vehicle as a basis for controlling mutual steering movement of said vehicle units.

According to an aspect of the present disclosure the system I for controlling driving operation of an articulated tracked vehicle may comprise a steering wheel angle determination device 190 for determining steering wheel angle of steering wheel of the articulated tracked vehicle. The a steering wheel angle determination device 190 may comprise one or more sensors arranged in connection to the steering wheel of the articulated tracked vehicle so as to detect the steering wheel angle.

The control device 100 may be configured to determine skidding and/or slipping of leading vehicle unit and/or trailing vehicle unit and/or entire articulated tracked vehicle. The control device 100 may further be configured to activate control of the steering arrangement of the steering device so as to control mutual steering movement of said vehicle units for dynamic stability control based on the thus determined skidding and/or slipping. The control device 100, when activating control of the steering arrangement based on the thus determined skidding and/or slipping, may be configured to control power provision of the drive arrangement and/or the braking system of the vehicle by activating one or more brakes of the braking system so as to brake one or more tracks of the track assemblies of the vehicle.

The control device 100 may be configured to determine the configuration of the ground on which the vehicle is driving comprising determining whether the ground is slippery. The control device 100 may further be configured to activate control of the steering arrangement of the steering device so as to control mutual steering movement of said vehicle units for dynamic stability control based on the thus determined configuration of the ground. The control device 100, when activating control of the steering arrangement based on the thus determined configuration of the ground, may be configured to control power provision of the drive arrangement and/or the braking system of the vehicle by

activating one or more brakes of the braking system so as to brake one or more tracks of the track assemblies of the vehicle.

For an articulated tracked vehicle having a steering device with a steering arrangement being provided with a hydraulic overflow function for preventing
5 forces in the steering device to exceed a certain threshold, which may be activated during drive on bumpy and/or slippery ground resulting in uncontrolled skidding/slipping of the vehicle, the control device 100 may be configured to determine such hydraulic overflow; and activate control of the steering arrangement of the steering device so as to control mutual steering
10 movement of said vehicle units for dynamic stability control based on the thus determined hydraulic overflow so as to prevent uncontrolled skidding/slipping. The control device 100, when activating control of the steering arrangement based on the thus determined hydraulic overflow, may be configured to control power provision of the drive arrangement and/or the braking system of the
15 vehicle by activating one or more brakes of the braking system so as to brake one or more tracks of the track assemblies of the vehicle so as to prevent uncontrolled skidding/slipping.

According to an aspect of the present disclosure, the control device 100 may, via a link 150a, be operably connected to the steering angle determination
20 device 150. According to an aspect of the present disclosure, the control device 100 may via the link 150a be arranged to receive a signal from the steering angle determination device 150 representing data about steering angle between the vehicle units of the articulated tracked vehicle.

According to an aspect of the present disclosure, the control device 100 may, via a link 160a, be operably connected to the drive arrangement power
25 determination device 160. According to an aspect of the present disclosure, the control device 100 may via the link 160a be arranged to receive a signal from the drive arrangement power determination device 160 representing data about current power of the drive arrangement of the articulated tracked vehicle.

According to an aspect of the present disclosure, the control device 100 may, via a link 170a, be operably connected to the drive wheel speed determination device 170. According to an aspect of the present disclosure, the control device 100 may via the link 170a be arranged to receive a signal from the drive
5 wheel speed determination device 170 representing data about drive wheel speed of drive wheels of the articulated tracked vehicle.

According to an aspect of the present disclosure, the control device 100 may, via a link 180a, be operably connected to the transmission speed determination device 180. According to an aspect of the present disclosure,
10 the control device 100 may via the link 180a be arranged to receive a signal from the transmission speed determination device 180 representing data about transmission speed of transmission arrangement of the articulated tracked vehicle.

According to an aspect of the present disclosure, the control device 100 may,
15 via a link 190a, be operably connected to the steering wheel angle determination device 190. According to an aspect of the present disclosure, the control device 100 may via the link 190a be arranged to receive a signal from the steering wheel angle determination device 190 representing data about steering wheel angle of steering wheel of the articulated tracked vehicle.

20 According to an aspect of the present disclosure, the control device 100 may, via a link 110a, be operably connected to the control arrangement 110. According to an aspect of the present disclosure, the control device 100 may via the link 110a be arranged to send a signal to the control arrangement 110 representing data about controlling the steering arrangement of the steering
25 device so as to control mutual steering movement of said vehicle units for dynamic stability control. The data about controlling the steering arrangement of the steering device may be based on processed data about steering angle between the vehicle units from the steering angle determination device 150. The data about controlling the steering arrangement of the steering device may
30 in addition be based on one or more of data about power of said drive

arrangement from the drive arrangement power determination device 160, data about speed of drive wheels from the drive wheel speed determination device 170, data about speed of transmission from the transmission speed determination device 180, and data about steering wheel angle from the steering wheel angle determination device 190.

According to an aspect of the present disclosure, the control device 100 may, via a link 112a, be operably connected to the brake member 112. According to an aspect of the present disclosure, the control device 100 may via the link 112a be arranged to send a signal to the brake member 112 representing data about providing a braking action on the steering arrangement of the steering device so as to control mutual steering movement of said vehicle units for dynamic stability control.

According to an aspect of the present disclosure, the control device 100 may, via a link 114a, be operably connected to the locking member 114. According to an aspect of the present disclosure, the control device 100 may via the link 114a be arranged to send a signal to the locking member 114 representing data about providing a locking action on the steering arrangement of the steering device so as to control mutual steering movement of said vehicle units for dynamic stability control.

According to an aspect of the present disclosure, the control device 100 may, via a link 116a, be operably connected to the damping member 116. According to an aspect of the present disclosure, the control device 100 may via the link 116a be arranged to send a signal to the damping member 116 representing data about providing a damping action on the steering arrangement of the steering device so as to control mutual steering movement of said vehicle units for dynamic stability control.

According to an aspect of the present disclosure, the control device 100 may, via a link 118a, be operably connected to the actuation member 118. According to an aspect of the present disclosure, the control device 100 may via the link

118a be arranged to send a signal to the actuation member 118 representing data about providing an actuation action on the steering arrangement of the steering device so as to control mutual steering movement of said vehicle units for dynamic stability control.

- 5 According to an aspect of the present disclosure, the control device 100 may, via a link 120a, be operably connected to the drive arrangement 120. According to an aspect of the present disclosure, the control device 100 may via the link 120a be arranged to send a signal to the drive arrangement 120 representing data about controlling the drive arrangement so as to control
- 10 mutual steering movement of said vehicle units for dynamic stability control. The data about controlling the drive arrangement 120 so as to control mutual steering movement of said vehicle units may be based on processed data about steering angle between the vehicle units from the steering angle determination device 150. The data about controlling the drive arrangement
- 15 120 so as to control mutual steering movement of said vehicle units may in addition be based on one or more of data about power of said drive arrangement from the drive arrangement power determination device 160, data about speed of drive wheels from the drive wheel speed determination device 170, data about speed of transmission from the transmission speed
- 20 determination device 180, and data about steering wheel angle from the steering wheel angle determination device 190.

- According to an aspect of the present disclosure, the control device 100 may, via a link 130a, be operably connected to the braking system 130 of the vehicle. According to an aspect of the present disclosure, the control device
- 25 100 may via the link 130a be arranged to send a signal to the braking system 130 representing data about controlling the braking system so as to control mutual steering movement of said vehicle units for dynamic stability control. The data about controlling the braking system 130 so as to control mutual steering movement of said vehicle units may be based on processed data
- 30 about steering angle between the vehicle units from the steering angle

determination device 150. The data about controlling the braking system 130 so as to control mutual steering movement of said vehicle units may in addition be based on one or more of data about power of said drive arrangement from the drive arrangement power determination device 160, data about speed of drive wheels from the drive wheel speed determination device 170, data about speed of transmission from the transmission speed determination device 180, and data about steering wheel angle from the steering wheel angle determination device 190.

According to an aspect of the present disclosure, the control device 100 may, via a link 140a, be operably connected to the transmission arrangement 140. According to an aspect of the present disclosure, the control device 100 may via the link 140a be arranged to send a signal to the transmission arrangement 140 representing data about controlling the transmission arrangement so as to control mutual steering movement of said vehicle units for dynamic stability control. The data about controlling the transmission arrangement 140 so as to control mutual steering movement of said vehicle units may be based on processed data about steering angle between the vehicle units from the steering angle determination device 150. The data about controlling the transmission arrangement 140 so as to control mutual steering movement of said vehicle units may in addition be based on one or more of data about power of said drive arrangement from the drive arrangement power determination device 160, data about speed of drive wheels from the drive wheel speed determination device 170, data about speed of transmission from the transmission speed determination device 180, and data about steering wheel angle from the steering wheel angle determination device 190.

The control device 100 according to the present disclosure may be configured to compare steering angle between said vehicle units and steering wheel angle of steering wheel of vehicle. The control device 100 may be configured to control mutual steering movement of said vehicle units so that power provision of the drive arrangement is reduced/cancelled out and/or steering angle

movement of steering arrangement is provided with a braking/locking/damping action by means of the control arrangement 110 and/or a track of one or more track assemblies are provided with a brake action by means of the braking system 130 of the vehicle if there is a change in the steering angle relative to the steering wheel angle of the vehicle, e.g. if the steering angle is changed without the steering wheel angle changing.

The control device 100 according to the present disclosure may be configured to compare speed of different drive wheels. The control device 100 may be configured to control mutual steering movement of said vehicle units so that speed and/or torque of one or more drive wheels is affected if speed of different drive wheels differ and/or speed of drive wheels differ from requested speed. Speed and/or torque of drive wheels may be affected/controlled by means of the braking system 130 of the vehicle and/or by means of one or more electric motors. Such electric motors may be associated with the driving arrangement 120 of the vehicle.

The control device 100, when controlling mutual steering movement of said vehicle units V1, V2, so as to reduce the risk of skidding and/or slipping for dynamic stability control, may thus be configured to perform said control by controlling said steering arrangement A1 and, in order to further improve manoeuvrability and avoidance of skidding and/or slipping, in addition, and cooperatively and adaptively, control one or more of: power provision of the drive arrangement 120; the braking system 130 of the vehicle; and the transmission arrangement 140 of the vehicle.

The control device 100 for controlling driving operation of an articulated tracked vehicle is, according to an embodiment, adapted to perform the method M1 described below with reference to fig. 6.

The control device 100 for controlling driving operation of an articulated tracked vehicle is, according to an embodiment, adapted to perform the method M2 described below with reference to fig. 7.

Fig. 6 schematically illustrates a flow chart of a method M1 performed by a control device for controlling driving operation of an articulated tracked vehicle according to an embodiment of the present disclosure.

Said articulated tracked vehicle comprises a drive arrangement for driving
5 drive wheels for operating the vehicle. The articulated tracked vehicle comprises a first vehicle unit and a second vehicle unit steerably connected to the first vehicle unit by means of a steering device for mutually pivoting said vehicle units. The mutual pivoting comprises steering movement about a steering axis. The steering device comprises a steering arrangement for said
10 steering movement.

According to the embodiment the method comprises a step S1. In this step the steering arrangement of the steering device is controlled so as to control mutual steering movement of said vehicle units for dynamic stability control.

The method M1 performed by a control device for controlling driving operation
15 of an articulated tracked vehicle is according to an embodiment adapted to be performed by the control device 100 described above with reference to fig. 5.

The method M1 performed by a control device for controlling driving operation of an articulated tracked vehicle is according to an embodiment adapted to be performed by the system I described above with reference to fig. 5.

20 Fig. 7 schematically illustrates a flow chart of a method M2 performed by a control device for controlling driving operation of an articulated tracked vehicle according to an embodiment of the present disclosure.

Said articulated tracked vehicle comprises a drive arrangement for driving
drive wheels for operating the vehicle. The articulated tracked vehicle
25 comprises a first vehicle unit and a second vehicle unit steerably connected to the first vehicle unit by means of a steering device for mutually pivoting said vehicle units. The mutual pivoting comprises steering movement about a

steering axis. The steering device comprises a steering arrangement for said steering movement.

The steering device may be any suitable steering device with a steering axis for providing mutual pivoting of the vehicle units comprising steering movement about the steering axis. The steering device may be a steering device as described with reference to fig. 2a-b, 3a-b. The steering arrangement of the steering device may be any suitable steering arrangement having taps, shafts and steering cylinder units. The steering arrangement may be a steering arrangement described with reference to fig. 2a-b, 3a-b.

10 According to the embodiment the method comprises a step S11. In this step the steering arrangement of the steering device is controlled by means of a control arrangement so as to control mutual steering movement of said vehicle units for dynamic stability control. The control arrangement may be any suitable control arrangement by means of which the steering arrangement may
15 be controlled, e.g. by locking and/or damping shafts/cylinders or the like of the control arrangement so as to control mutual steering movement of said vehicle units of the articulated tracked vehicle.

According to an aspect of the present disclosure the method step of controlling the steering arrangement by means of the control arrangement may comprise
20 the step(s) S11A of providing a brake function and/or a locking function and/or a damping function and/or an actuation function of the control arrangement.

The step(s) S11A may thus comprise a step of providing a brake function on the steering arrangement by means of a brake member. The brake member may be any suitable brake member for providing a brake function on the
25 steering arrangement, e.g. a brake member 112 as described with reference to fig. 5.

The step(s) S11A may thus comprise a step of providing a locking function on the steering arrangement by means of a locking member. The locking member may be any suitable locking member for providing a locking function on the

steering arrangement, e.g. a locking member 114 as described with reference to fig. 5.

The step(s) S11A may thus comprise a step of providing a damping function on the steering arrangement by means of a damping member. The damping
5 member may be any suitable damping member for providing a damping function on the steering arrangement, e.g. a damping member 116 as described with reference to fig. 5.

The step(s) S11A may thus comprise a step of providing an actuation function on the steering arrangement by means of an actuator member. The actuator
10 member may be any suitable actuator member for providing an actuation function on the steering arrangement, e.g. an actuator member 118 as described with reference to fig. 5.

According to an aspect of the present disclosure the method step S11 of controlling mutual steering movement of said vehicle units may further
15 comprise the step(s) S11B of controlling one or more of: power provision of the drive arrangement; a braking system of the vehicle; and a transmission arrangement of the vehicle.

The step(s) S11B may thus comprise a step of controlling power provision of the drive arrangement of the articulated tracked vehicle. The drive
20 arrangement may comprise an internal combustion engine and/or one or more electric machines for driving the vehicle, i.e. driving the drive wheels of the track assemblies of the vehicle. The drive arrangement may be a drive arrangement 120 as described with reference to fig. 5.

The step(s) S11B may thus comprise a step of controlling the braking system
25 of the articulated tracked vehicle. The braking system of the vehicle may comprise brake members arranged in connection to the drive wheels of the track assemblies of the vehicle. The braking system may be a braking system 130 as described with reference to fig. 5.

The step(s) S11B may thus comprise a step of controlling the transmission arrangement of the articulated tracked vehicle. The transmission arrangement of the vehicle 140 of the vehicle may comprise any suitable gear arrangement for providing gear shifts of the drive wheels of the track assemblies of the vehicle. The transmission arrangement may be a transmission arrangement 140 as described with reference to fig. 5.

According to an aspect of the present disclosure the method step S11 of controlling mutual steering movement of said vehicle units may be performed S11C based on one or more of: steering angle between said vehicle units; power of said drive arrangement; speed of drive wheels; speed of transmission; steering wheel angle of steering wheel of vehicle.

According to an aspect of the present disclosure the method M2 may comprise the step of determining one or more of: steering angle between said vehicle units; power of said drive arrangement; speed of drive wheels; speed of transmission; steering wheel angle of steering wheel of vehicle.

The step S11C may comprise performing control of mutual steering movement of said vehicle units based on steering angle between said vehicle units. According to an aspect of the present disclosure the method M2 may comprise the step of determining steering angle between said vehicle units as a basis for controlling mutual steering movement of said vehicle units. The steering angle between said vehicle units of the tracked articulated vehicle may be determined by means of any suitable angle sensor.

The step S11C may comprise performing control of mutual steering movement of said vehicle units based on power of said drive arrangement. According to an aspect of the present disclosure the method M2 may comprise the step of determining power of said drive arrangement as a basis for controlling mutual steering movement of said vehicle units.

The step S11C may comprise performing control of mutual steering movement of said vehicle units based on speed of drive wheels of the articulated tracked

vehicle. According to an aspect of the present disclosure the method M2 may comprise the step of determining speed of drive wheels as a basis for controlling mutual steering movement of said vehicle units. The speed of drive wheels of the tracked articulated vehicle may be determined by means of any
5 suitable wheel sensor arranged in connection to drive wheels of the vehicle.

The step S11C may comprise performing control of mutual steering movement of said vehicle units based on speed of transmission of the articulated tracked vehicle. According to an aspect of the present disclosure the method M2 may comprise the step of determining speed of transmission as a basis for
10 controlling mutual steering movement of said vehicle units. The speed of transmission of the tracked articulated vehicle may be determined by means of any suitable wheel sensor arranged in connection to the transmission of the vehicle.

The step S11C may comprise performing control of mutual steering movement
15 of said vehicle units based on steering wheel angle of steering wheel of the articulated tracked vehicle. According to an aspect of the present disclosure the method M2 may comprise the step of determining steering wheel angle of steering wheel as a basis for controlling mutual steering movement of said vehicle units. The steering wheel angle of steering wheel of the tracked
20 articulated vehicle may be determined by means of any suitable angle sensor arranged in connection to the steering wheel of the vehicle.

The method may comprise the step of receiving information about one or more of: steering angle between said vehicle units from steering angle determination device; power of said drive arrangement from power determination device;
25 speed of drive wheels from drive wheel speed determination device; speed of transmission from transmission speed determination device; steering wheel angle of steering wheel of vehicle from steering wheel angle determination device.

According to an aspect of the present disclosure, the step(s) S11A of providing a brake function and/or a locking function and/or a damping function and/or an actuation function on the steering arrangement by means of the control arrangement for controlling mutual steering movement of said vehicle units,
5 may be based on received information about one or more of: steering angle between said vehicle units from steering angle determination device; power of said drive arrangement from power determination device; speed of drive wheels from drive wheel speed determination device; speed of transmission from transmission speed determination device.

10 According to an aspect of the present disclosure the step(s) S11B of controlling one or more of: power provision of the drive arrangement; a braking system of the vehicle; and a transmission arrangement of the vehicle, may be based on and/or considering received information about one or more of: steering angle between said vehicle units from steering angle determination device; power of
15 said drive arrangement from power determination device; speed of drive wheels from drive wheel speed determination device; speed of transmission from transmission speed determination device.

According to an aspect of the present disclosure the step(s) S11B of controlling one or more of: power provision of the drive arrangement; a braking system of
20 the vehicle; and a transmission arrangement of the vehicle, may be based on and/or considering the step(s) S11A of providing a brake function and/or a locking function and/or a damping function and/or an actuation function on the steering arrangement by means of the control arrangement.

According to an aspect of the present disclosure, the step(s) S11A of providing
25 a brake function and/or a locking function and/or a damping function and/or an actuation function on the steering arrangement by means of the control arrangement for controlling mutual steering movement of said vehicle units, may be performed cooperatively and adaptively with the step(s) S11B of controlling one or more of: power provision of the drive arrangement; a braking
30 system of the vehicle; and a transmission arrangement of the vehicle.

The method according to the present disclosure may comprise the step of comparing steering angle between said vehicle units and steering wheel angle of steering wheel of vehicle. The method may comprise the step of controlling mutual steering movement of said vehicle units so that power provision of the drive arrangement is reduced/cancelled out and/or steering angle movement of steering arrangement is provided with a braking/locking/damping action by means of the control arrangement and/or track of one or more track assemblies are provided with a brake action by means of the braking system of the vehicle if there is a change in the steering angle relative to the steering wheel angle of the vehicle, e.g. if the steering angle is changed without the steering wheel angle changing.

The method according to the present disclosure may comprise the step of comparing speed of different drive wheels. The method may comprise the step of controlling mutual steering movement of said vehicle units so that speed and/or torque of one or more drive wheels is affected if speed of different drive wheels differ and/or speed of drive wheels differ from requested speed.

The method according to the present disclosure may comprise the step of determining skidding and/or slipping of leading vehicle unit and/or trailing vehicle unit and/or entire articulated tracked vehicle. The method may further comprise the step of activating control of the steering arrangement of the steering device so as to control mutual steering movement of said vehicle units for dynamic stability control based on the thus determined skidding and/or slipping. The step of activating control of the steering arrangement based on the thus determined skidding and/or slipping may comprise controlling power provision of the drive arrangement and/or the braking system of the vehicle by activating one or more brakes of the braking system so as to brake one or more tracks of the track assemblies of the vehicle.

The method according to the present disclosure may comprise the step of determining the configuration of the ground on which the vehicle is driving comprising determining whether the ground is slippery. The method may

further comprise the step of activating control of the steering arrangement of the steering device so as to control mutual steering movement of said vehicle units for dynamic stability control based on the thus determined configuration of the ground. The step of activating control of the steering arrangement based
5 on the thus determined configuration of the ground may comprise controlling power provision of the drive arrangement and/or the braking system of the vehicle by activating one or more brakes of the braking system so as to brake one or more tracks of the track assemblies of the vehicle.

For an articulated tracked vehicle having a steering device with a steering
10 arrangement being provided with a hydraulic overflow function for preventing forces in the steering device to exceed a certain threshold, which may be activated during drive on bumpy and/or slippery ground resulting in uncontrolled skidding/slipping of the vehicle, the method according to the present disclosure may further comprise the step of determining such hydraulic
15 overflow; and activating control of the steering arrangement of the steering device so as to control mutual steering movement of said vehicle units for dynamic stability control based on the thus determined hydraulic overflow so as to prevent uncontrolled skidding/slipping. The step of activating control of the steering arrangement based on the thus determined hydraulic overflow
20 may comprise controlling power provision of the drive arrangement and/or the braking system of the vehicle by activating one or more brakes of the braking system so as to brake one or more tracks of the track

The method M2 performed by a control device for controlling driving operation of an articulated tracked vehicle is according to an embodiment adapted to be
25 performed by the control device 100 described above with reference to fig. 5.

The method M2 performed by a control device for controlling driving operation of an articulated tracked vehicle is according to an embodiment adapted to be performed by the system I described above with reference to fig. 5.

With reference to fig. 8, a diagram of a computer 500/apparatus 500 is shown. The control device 100 described with reference to fig. 5 may according to an embodiment comprise apparatus 500. Apparatus 500 comprises a non-volatile memory 520, a data processing device 510 and a read/write memory 550.

- 5 Non-volatile memory 520 has a first memory portion 530 wherein a computer program, such as an operating system, is stored for controlling the function of apparatus 500. Further, apparatus 500 comprises a bus controller, a serial communication port, I/O-means, an A/D-converter, a time date entry and transmission unit, an event counter and an interrupt controller (not shown).
- 10 Non-volatile memory 520 also has a second memory portion 540.

A computer program P is provided comprising routines for controlling driving operation of an articulated tracked vehicle.

- Said articulated tracked vehicle comprises a drive arrangement for driving drive wheels for operating the vehicle. The articulated tracked vehicle
- 15 comprises a first vehicle unit and a second vehicle unit steerably connected to the first vehicle unit by means of a steering device for mutually pivoting said vehicle units. The mutual pivoting comprises steering movement about a steering axis. The steering device comprises a steering arrangement for said steering movement.

- 20 The program P comprises routines for controlling the steering arrangement of the steering device so as to control mutual steering movement of said vehicle units for dynamic stability control.

The routines for controlling the steering arrangement comprises routines for performing said control by means of a control arrangement.

- 25 The routines for controlling the steering arrangement by means of the control arrangement comprises routines for providing a brake function and/or a locking function and/or an damping function and/or an actuation function of the control arrangement.

The routines for controlling mutual steering movement of said vehicle units further comprises routines for controlling one or more of: power provision of the drive arrangement; a braking system of the vehicle; and a transmission arrangement of the vehicle.

- 5 The routines for controlling mutual steering movement of said vehicle units is performed based on one or more of: steering angle between said vehicle units; power of said drive arrangement; speed of drive wheels; speed of transmission; steering wheel angle of steering wheel of vehicle.

The computer program P may be stored in an executable manner or in a
10 compressed condition in a separate memory 560 and/or in read/write memory 550.

When it is stated that data processing device 510 performs a certain function it should be understood that data processing device 510 performs a certain part of the program which is stored in separate memory 560, or a certain part
15 of the program which is stored in read/write memory 550.

Data processing device 510 may communicate with a data communications port 599 by means of a data bus 515. Non-volatile memory 520 is adapted for communication with data processing device 510 via a data bus 512. Separate memory 560 is adapted for communication with data processing device 510
20 via a data bus 511. Read/write memory 550 is adapted for communication with data processing device 510 via a data bus 514. To the data communications port 599 e.g. the links connected to the control device 100 may be connected.

When data is received on data port 599 it is temporarily stored in second memory portion 540. When the received input data has been temporarily
25 stored, data processing device 510 is set up to perform execution of code in a manner described above.

The signals received on data port 599 may be used by apparatus 500 for controlling the steering arrangement of the steering device so as to control mutual steering movement of said vehicle units for dynamic stability control.

5 The signals used by apparatus 500 for controlling the steering arrangement comprises signals used for performing said control by means of a control arrangement.

10 The signals used by apparatus 500 for controlling the steering arrangement by means of the control arrangement comprises signals used for providing a brake function and/or a locking function and/or an damping function and/or an actuation function of the control arrangement.

The signals used by apparatus 500 for controlling mutual steering movement of said vehicle units further comprises signals used for controlling one or more of: power provision of the drive arrangement; a braking system of the vehicle; and a transmission arrangement of the vehicle.

15 The signals used by apparatus 500 for controlling mutual steering movement of said vehicle units is performed based on one or more of: steering angle between said vehicle units; power of said drive arrangement; speed of drive wheels; speed of transmission; steering wheel angle of steering wheel of vehicle.

20 Parts of the methods described herein may be performed by apparatus 500 by means of data processing device 510 running the program stored in separate memory 560 or read/write memory 550. When apparatus 500 runs the program, parts of the methods described herein are executed.

25 The foregoing description of the preferred embodiments of the present invention has been provided for the purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise forms disclosed. Obviously, many modifications and variations will be apparent to practitioners skilled in the art. The embodiments were chosen and described

in order to best explain the principles of the invention and its practical applications, thereby enabling others skilled in the art to understand the invention for various embodiments and with the various modifications as are suited to the particular use contemplated.

CLAIMS

1. A method (M1) performed by a control device (100) for controlling driving operation of an articulated tracked vehicle (V), said articulated tracked vehicle (V) comprising a drive arrangement (120) for driving drive wheels (1) for operating the vehicle (V), a brake system (130) for braking the drive wheels (1) of the vehicle, and a transmission arrangement (140) for providing gear shift of the drive wheels (1), the articulated tracked vehicle (V) comprising a first vehicle unit (V1) and a second vehicle unit (V2) steerably connected to the first vehicle unit (V1) by means of a steering device (D) for mutually pivoting said vehicle units (V1, V2), the mutual pivoting comprising steering movement about a steering axis (Y), the steering device (D) comprising a steering arrangement (A1) for said steering movement about the steering axis (Y), the steering arrangement (A1) comprising steering cylinders for facilitating the mutual pivoting about the steering axis (Y), the method comprising the steps of, during drive of the vehicle:

 - determining one or more of: steering angle between said vehicle units (V1, V2); power of said drive arrangement (120); speed of the drive wheels; speed of transmission of the transmission arrangement (140); and steering wheel angle of a steering wheel of the vehicle; and,
 - controlling (S1) the steering arrangement (A1) of the steering device (D) by means of a control arrangement (110) acting on the steering arrangement comprising acting on the steering cylinders based on one or more of: steering angle between said vehicle units (V1, V2); power of said drive arrangement (120); speed of the drive wheels; speed of transmission of said transmission arrangement (140); and steering wheel angle of the steering wheel of the vehicle so as to control mutual steering movement of said vehicle units so as to reduce a risk of skidding and/or slipping for dynamic stability control.
2. A method according to claim 1, wherein the step of controlling the steering arrangement by means of the control arrangement (110) comprises providing

a brake function and/or a locking function and/or a damping function and/or an actuation function of the control arrangement (110).

3. A method according to any claim 1 or 2, wherein the step of controlling mutual steering movement of said vehicle units (V1, V2) further comprises controlling one or more of: power provision of the drive arrangement (120); a braking system (130) of the vehicle; and a transmission arrangement of the vehicle.
4. A control device (100) for controlling driving operation of an articulated tracked vehicle (V), said articulated tracked vehicle comprising a drive arrangement (120) for driving drive wheels for operating the vehicle, a brake system (130) for braking the drive wheels (1) of the vehicle, and a transmission arrangement (140) for providing gear shift of the drive wheels (1), the articulated tracked vehicle comprising a first vehicle units (V1) and a second vehicle units (V2) steerably connected to the first vehicle units (V1) by means of a steering device for mutually pivoting said vehicle units (V1, V2), the mutual pivoting comprising steering movement about a steering axis (Y), the steering device (D) comprising a steering arrangement (A1) for said steering movement about the steering axis (Y), the steering arrangement (A1) comprising steering cylinders for facilitating the mutual pivoting about the steering axis (Y), the control device being configured to, during drive of the vehicle:
 - determine one or more of: steering angle between said vehicle units (V1, V2); power of said drive arrangement (120); speed of the drive wheels; speed of transmission of the transmission arrangement (140); and steering wheel angle of a steering wheel of the vehicle; and
 - control (S1) the steering arrangement (A1) of the steering device by means of a control arrangement (110) acting on the steering arrangement comprising acting on the steering cylinders based on one or more of: steering angle between said vehicle units (V1, V2); power of said drive arrangement (120); speed of the drive wheels; speed of transmission of said transmission arrangement (140); and steering wheel angle of the steering wheel of the

vehicle so as to control mutual steering movement of said vehicle units (V1, V2) so as to reduce a risk of skidding and/or slipping for dynamic stability control.

- 5 5. A control device according to claim 4, the control arrangement (110) comprising a brake member (112) for providing a brake function and/or a locking member (114) for providing a locking function and/or a damping member (116) for providing a damping function and/or an actuator member (118) for providing an actuation function.

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6. A control device according to claim 4 or 5, the control device (100), when controlling mutual steering movement of said vehicle units (V1, V2), further being configured to control one or more of: power provision of the drive arrangement (120); a braking system (130) of the vehicle (V); and a
15 transmission arrangement (140) of the vehicle (V).

7. An articulated tracked vehicle (V) comprising a control device (100) according to any of claims 4-6.

- 20 8. A computer program (P) for controlling driving operation of an articulated tracked vehicle, said computer program (P) comprising program code which, when run on a control device (100) or another computer (500) connected to the control device (100), causes the control device to perform the steps according to claim 1-3.

25

9. A computer readable medium comprising instructions which, when executed by a computer, cause the computer to carry out the method according to anyone of claims 1-3.