Claims:

1. A method for moving a lifting device (1), preferably a loading crane, wherein the lifting device (1) has a controller (6) and an arm system with arms (2, 3, 4, 5, 7, 8, 18) with a geometry that can be changed by at least one actuator (20, 21, 22, 23, 25) along at least one degree of freedom (α, β, φ, γ, L, J, H), characterized in that

- in a presetting phase, at least one target position for the lifting device (1) is preset, wherein the presetting occurs by specifying the geometry of the arm system in at least one target position on the basis of the at least one degree of freedom (α, β, φ, γ, L, J, H) via a user interface of the controller (6) and/or the lifting device (1) is brought into at least one target position by controlling actuators (20, 21, 22, 23, 25) and in the at least one target position, the instantaneous geometry of the arm system is detected on the basis of the at least one degree of freedom (α, β, φ, γ, L, J, H),

- in a measuring phase a detection of the instantaneous geometry of the arm system takes place based on the at least one degree of freedom (α, β, φ, γ, L, J, H),

- in a selection phase, a selection of at least one target position specified in the presetting phase takes place,

- in a comparison phase, a geometrical deviation (Δα, Δβ, Δφ, Δγ, ΔL, ΔJ, ΔH) between the geometry of the at least one target position selected in the selection phase and the instantaneous geometry detected in the measuring phase is determined by comparing the respective geometries of the arm system on the basis of the at least one degree of freedom (α, β, φ, γ, L, J, H).

- in a generation phase, on the basis of the geometry deviation (Δα, Δβ, Δφ, Δγ, ΔL, ΔJ, ΔH), determined in the comparison phase, at least one control command, preferably in the form of at least one control pulse (p1, p2), is generated for controlling at least one of the actuators (20, 21, 22, 23, 25) of the lifting device (1) for approaching or at least partially transferring the arm system of the lifting device (1) from the geometry detected

in the measuring phase to the geometry of the at least one target position selected in the selection phase, and

- in a control phase, the lifting device (1) is at least partially moved into the selected target position by controlling the actuators (20, 21, 22, 23, 25) of the arm system with the at least one control command generated in the generation phase.

2. The method according to the preceding claim, wherein the at least one target position corresponds to a substantially freely selectable position of the lifting device (1).

3. The method according to any one of the preceding claims, wherein the instantaneous geometry of the lifting device (1) detected in the measuring phase corresponds to a geometry of the arm system which deviates from the target position selected in the selection phase - and which is preferably essentially freely selectable by controlling actuators (20, 21, 22, 23, 25).

4. The method according to any one of the preceding claims, wherein the detection of an instantaneous geometry is carried out on the basis of sensor data from sensors (s1, s2, k1, k2, k3, f1) arranged on the lifting device (1) for angle measurement and/or length measurement.

5. The method according to any one of the preceding claims, wherein

- when detecting the instantaneous geometry of the arm system and/or
- specifying the geometry of the arm system via a user interface of the controller (6)

a deflection of the arm system is determined on the basis of a calculation model.

6. The method according to any one of the preceding claims, wherein

- when detecting the instantaneous geometry of the arm system and/or
- specifying the geometry of the arm system via a user interface of the controller (6)

a detection of an inclination (λ) of the lifting device (1) relative to a preset or predeterminable spatial direction takes place.

7. The method according to any one of the preceding claims, wherein

- when detecting the instantaneous geometry of the arm system and/or
- specifying the geometry of the arm system via a user interface of the controller (6)

a detection of a position of at least one additional device (9, 10, 32) relative to the arm system of the lifting device (1) and/or a geometry detection of the at least one additional device (9, 10, 32) is carried out on the basis of at least one degree of freedom of the geometry of the at least one additional device (9, 10, 32).

8. The method according to any one of the preceding claims, wherein the at least one control command is generated to approach or transfer the arm system of the lifting device (1) from the geometry detected in the measuring phase to a geometry that approximates the geometry of the at least one target position selected in the selection phase within a predeterminable or preset tolerance range.

9. The method according to one of the preceding claims, wherein in the generation phase control commands are generated only for actuators (20, 21, 22, 23, 25), for which in the comparison phase a geometric deviation ($\Delta\alpha$, $\Delta\beta$, $\Delta\varphi$, $\Delta\gamma$, ΔL, ΔJ, ΔH) along the at least one degree of freedom (α, β, φ, γ, L, J, H) corresponding to the actuator (20, 21, 22, 23, 25) is determined.

10. The method according to any one of the preceding claims, wherein in the presetting phase at least one value of at least one degree of freedom (α, β, φ, γ, L, J, H) of arms of the arm system that are movable relative to one another along the at least one degree of freedom (α, β, φ, γ, L, J, H) is specified and/or detected, in the measuring phase a repeated detection of at least one value of at least one degree of freedom (α, β, φ, γ, L, J, H) takes place and in the comparison phase the geometry deviation ($\Delta\alpha$, $\Delta\beta$, $\Delta\varphi$, $\Delta\gamma$, ΔL, ΔJ, ΔH) is determined by determining a deviation of the at least one value selected accordingly in the selection phase and specified and/or detected in the presetting phase from the at least one value detected in the measuring phase.

11. The method according to any one of the preceding claims, wherein the at least one

control command generated in the generation phase comprises information regarding an actuator (20, 21, 22, 23, 25) to be controlled and a nominal signal duration (t1, t2) regarding the duration of the control.

12. The method according to any one of the preceding claims, wherein at least two control commands are generated in the generation phase and the actuators (20, 21, 22, 23, 25) are controlled in the control phase with the at least two control commands generated in the generation phase at least partially sequentially and/or at least partially simultaneously.

13. The method according to any one of the preceding claims, wherein at least two control commands are generated in the generation phase and the actuators (20, 21, 22, 23, 25) are controlled in the control phase with the at least two control commands generated in the generation phase

- at least partially sequentially ordered according to the magnitude of the geometry change when controlling an actuator (20, 21, 22, 23, 25) of the controlled actuators (20, 21, 22, 23, 25), and/or
- at least partially sequentially ordered according to the magnitude of the reduction of the load on the arm system when controlling an actuator (20, 21, 22, 23, 25) of the controlled actuators (20, 21, 22, 23, 25), and/or
- at least partially ordered according to a cost function, and/or
- at least partially simultaneously, wherein a respective signal duration (t1, t2, t3) of the at least two control commands is adjusted to a largest nominal signal duration (t1, t2) of the control commands.

14. The method according to any one of the preceding claims, wherein in the presetting phase the lifting device (1) is essentially freely movable with control commands generated by a user via a controller (6) with operating commands for controlling actuators (20, 21, 22, 23, 25) and in the control phase a movement of the lifting device (1) takes place by at

least one control command generated by a controller (6) in the generation phase.

15. The method according to any one of the preceding claims, wherein in the control phase, a movement of the lifting device (1) is carried out at least partially automatically by outputting the at least one control command generated in the generation phase by a controller (6).

16. A controller (6) for a hydraulic lifting device (1), preferably for a loading crane, which is designed to carry out a method for moving a lifting device (1) according to any one of the preceding claims, wherein, by the controller (6)

- in a first operating mode, the presetting phase for presetting at least one target position can be carried out by specifying the geometry of the arm system in at least one target position on the basis of at least one degree of freedom (α, β, φ, γ, L, J, H) via a user interface of the controller (6) and/or by controlling actuators (20, 21, 22, 23, 25) and for detecting the instantaneous geometry of the arm system on the basis of at least one degree of freedom (α, β, φ, γ, L, J, H),
- in a second operating mode, the measuring phase can be carried out for repeatedly detecting the instantaneous geometry of the arm system on the basis of at least one degree of freedom (α, β, φ, γ, L, J, H),
- in a third operating mode, the selection phase can be carried out to select at least one target position preset in the presetting phase,
- in a fourth operating mode, the comparison phase for determining the geometry deviation (Δα, Δβ, Δφ, Δγ, ΔL, ΔJ, ΔH) can be carried out on the basis of at least one degree of freedom (α, β, φ, γ, L, J, H) between the geometry of the at least one target position selected in the selection phase and the instantaneous geometry detected in the measuring phase,
- in a fifth operating mode, the generation phase for generating at least one control command for controlling at least one of the actuators (20, 21, 22, 23, 25) of the lifting

device (1) for transferring the arm system of the lifting device (1) from the geometry detected in the measuring phase to the geometry of the at least one target position selected in the selection phase can be carried out with a computing unit (12) of the controller (6) which is configured to this end, and

- in a sixth operating mode, the control phase for - preferably at least partially automated - controlling the actuators (20, 21, 22, 23, 25) of the arm system of the lifting device (1) can be carried out by outputting the at least one control command generated in the generation phase by the controller (6).

17. The controller (6) for a lifting device (1) according to the preceding claim, wherein the controller (6) activates at least one operating element of a user interface in the sixth operating mode for controlling the actuators (20, 21, 22, 23, 25) and by actuating the at least one operating element (17), the geometry of the arm system can be changed at least partially automatically by the controller (6), wherein preferably the controller (6) controls a rate of change of the geometry of the arm system depending on an actuation of the at least one operating element (17) of the user interface.

18. A computer program product, comprising commands which, when executed by the computing unit (12) of the controller (6) according to one of claims 16 or 17, cause the latter to carry out a method according to any one of claims 1 to 15 from a memory (11) which is in a data connection with the computing unit (12) or can be brought into such a connection with the same.

19. A data carrier signal that transmits the computer program product according to the preceding claim.

20. A lifting device (1), in particular a loading crane, with an arm system having a plurality of arms (2, 3) movable by actuators (20, 21), wherein the arm system has at least:

- a crane column (2) rotatable about a rotation axis (v1) by a first actuator (20), wherein the arm system has a first degree of freedom (φ) due to the pivotable mounting

of the crane column (2),

- a main arm (3) that can be pivoted relative to the crane column (2) by means of a second actuator (21), wherein the arm system has a second degree of freedom (α) due to the pivotable mounting of the main arm (3).

and wherein the lifting device (1) has a controller (6) according to any one of claims 18 or 19, with which control commands can be output to actuators (20, 21) of the arm system in order to change the geometry of the arm system, wherein an instantaneous geometry of the arm system can be detected by the controller (6) on the basis of sensors (k1, f1) installed on the arm system on the basis of the degrees of freedom (φ, α) of the lifting device (1).