[CLAIMS]

[Claim 1]

A route control program generation device comprising:

an environment model construction unit configured to construct a group of a plurality of environment models with different states, each of which is constituted by a track divided into a plurality of sections, a first moving body that is a control target moving on the track, and a second moving body other than the control target, a state of which is determined by the sections where the first moving body and the second moving body are present and the sections booked for the first moving body and the second moving body, by changing the booking of the sections for the first moving body and the second moving body, cancellation of the booking, the sections where the first moving body and the second moving body are present after moving from the booked sections to other booked sections, and the sections booked for the first moving body and the second moving body; and

a search unit configured to search for an order to reach a state of an environment model that satisfies a request for moving the first moving body to a prescribed section that is a goal without bringing the first moving body into a deadlock state with respect to the second moving body while changing a state of an environment model included in the group to a state of another environment model,

wherein the environment model construction unit constructs the group using the state of the environment model that matches a prescribed restriction condition on the basis of the restriction condition regarding restricting reservation of the section for at least one of the first moving body and the second moving body,

wherein the restriction condition is one or more of:

the number of the sections to be booked is equal to or less than a prescribed value for at least one of the first moving body and the second moving body,

the number of the sections that are able to be booked at the same time for one state transition is equal to or less than a prescribed value for at least one of the first moving body and the second moving body,

the sections in a traveling direction are able to be booked while the other sections are not able to be booked for at least one of the first moving body and the second moving body,

the sections up to a prescribed value counted from the currently present

section in a traveling direction are able to be booked while the other sections are not able to be booked for at least one of the first moving body and the second moving body.

[Claim 2]

A route control program generation device comprising:

an environment model construction unit configured to construct a group of a plurality of environment models with different states, each of which is constituted by a track divided into a plurality of sections, a first moving body that is a control target moving on the track, and a second moving body other than the control target, a state of which is determined by the sections where the first moving body and the second moving body are present and the sections booked for the first moving body and the second moving body, by changing the booking of the sections for the first moving body and the second moving body, cancellation of the booking, the sections where the first moving body and the second moving body are present after moving from the booked sections to other booked sections, and the sections booked for the first moving body and the second moving body; and

a search unit configured to search for an order to reach a state of an environment model that satisfies a request for moving the first moving body to a prescribed section that is a goal without bringing the first moving body into a deadlock state with respect to the second moving body while changing a state of an environment model included in the group to a state of another environment model,

wherein the search unit performs the searching while performing the transition to the state of the environment model that matches a prescribed restriction condition on the basis of the restriction condition regarding restricting reservation of the section for at least one of the first moving body and the second moving body,

wherein the restriction condition is one or more of:

the number of the sections to be booked is equal to or less than a prescribed value for at least one of the first moving body and the second moving body,

the number of the sections that are able to be booked at the same time for one state transition is equal to or less than a prescribed value for at least one of the first moving body and the second moving body,

the sections in a traveling direction are able to be booked while the other sections are not able to be booked for at least one of the first moving body and the second moving body,

the sections up to a prescribed value counted from the currently present section in a traveling direction are able to be booked while the other sections are not able to be booked for at least one of the first moving body and the second moving body.

[Claim 3]

The route control program generation device according to claim 1 or 2,

wherein when elapse of a time corresponding to a change in state of the environment model when the first moving body or the second moving body moves to an adjacent one of the sections once is defined as one logical time period,

the restriction condition is further set such that an upper limit of the number of times booking and cancellation of the booking that are executed in the one logical time period is provided for at least one of the first moving body and the second moving body.

[Claim 4]

The route control program generation device according to claim 3, wherein in a case in which the search unit is not able to search for the order to reach the state of the environment model that satisfies the request, the group of environment models is constructed by increasing an upper limit of the number of times of the execution, and the order to reach the state of the environment model that satisfies the request is searched for.

[Claim 5]

The route control program generation device according to any one of claims 1 to 4,

wherein when elapse of a time corresponding to a change in state of the environment model when the first moving body or the second moving body moves to an adjacent one of the sections once is defined as one logical time period,

the restriction condition is further set such that execution of both the booking and the cancellation of the booking for one of the sections is inhibited in the one logical time period.

[Claim 6]

The route control program generation device according to any one of claims 1 to 5, wherein the environment model includes a plurality of second moving bodies.

[Claim 7]

A route control program generation method comprising:

constructing a group of a plurality of environment models with different states, each of which is constituted by a track divided into a plurality of sections, a first moving body that is a control target moving on the track, and a second moving body other than the control target, a state of which is determined by the sections where the first moving body and the second moving body are present and the sections booked for the first moving body and the second moving body, by changing the booking of the sections for the first moving body and the second moving body, cancellation of the booking, the sections where the first moving body and the second moving body are present after moving from the booked sections to other booked sections, and the sections booked for the first moving body and the second moving body; and

searching for an order to reach a state of an environment model that satisfies a request for moving the first moving body to a prescribed section that is a goal without bringing the first moving body into a deadlock state with respect to the second moving body while changing a state of an environment model included in the group to a state of another environment model,

wherein in the constructing of the group, the group is constructed using the state of the environment model that matches a prescribed restriction condition on the basis of the restriction condition regarding restricting reservation of the section for at least one of the first moving body and the second moving body,

wherein the restriction condition is one or more of:

the number of the sections to be booked is equal to or less than a prescribed value for at least one of the first moving body and the second moving body,

the number of the sections that are able to be booked at the same time for one state transition is equal to or less than a prescribed value for at least one of the first moving body and the second moving body,

the sections in a traveling direction are able to be booked while the other sections are not able to be booked for at least one of the first moving body and the second moving body,

the sections up to a prescribed value counted from the currently present section in a traveling direction are able to be booked while the other sections are not able to be booked for at least one of the first moving body and the second moving body.

[Claim 8]

A route control program generation method comprising:

constructing a group of a plurality of environment models with different states, each of which is constituted by a track divided into a plurality of sections, a first moving body that is a control target moving on the track, and a second moving body other than the control target, a state of which is determined by the sections where the first moving body and the second moving body are present and the sections booked for the first moving body and the second moving body, by changing the booking of the sections for the first moving body and the second moving body, cancellation of the booking, the sections where the first moving body and the second moving body are present after moving from the booked sections to other booked sections, and the sections booked for the first moving body and the second moving body; and

searching for an order to reach a state of an environment model that satisfies a request for moving the first moving body to a prescribed section that is a goal without bringing the first moving body into a deadlock state with respect to the second moving body while changing a state of an environment model included in the group to a state of another environment model,

wherein in the searching of the order, the searching is performed with transition to the state of the environment model that matches a prescribed restriction condition on the basis of the restriction condition regarding restricting reservation of the section for at least one of the first moving body and the second moving body,

wherein the restriction condition is one or more of:

the number of the sections to be booked is equal to or less than a prescribed value for at least one of the first moving body and the second moving body,

the number of the sections that are able to be booked at the same time for one state transition is equal to or less than a prescribed value for at least one of the first moving body and the second moving body,

the sections in a traveling direction are able to be booked while the other sections are not able to be booked for at least one of the first moving body and the second moving body,

the sections up to a prescribed value counted from the currently present section in a traveling direction are able to be booked while the other sections are not able to be booked for at least one of the first moving body and the second moving body.

[Claim 9]

A program that causes a computer to execute:

constructing a group of a plurality of environment models with different states, each of which is constituted by a track divided into a plurality of sections, a first moving body that is a control target moving on the track, and a second moving body other than the control target, a state of which is determined by the sections where the first moving body and the second moving body are present and the sections booked for the first moving body and the second moving body, by changing the booking of the sections for the first moving body and the second moving body, cancellation of the booking, the sections where the first moving body and the second moving body are present after moving from the booked sections to other booked sections, and the sections booked for the first moving body and the second moving body; and

searching for an order to reach a state of an environment model that satisfies a request for moving the first moving body to a prescribed section that is a goal without bringing the first moving body into a deadlock state with respect to the second moving body while changing a state of an environment model included in the group to a state of another environment model,

wherein in the constructing of the group, the group is constructed using the state of the environment model that matches a prescribed restriction condition on the basis of the restriction condition regarding restricting reservation of the section for at least one of the first moving body and the second moving body,

wherein the restriction condition is one or more of:

the number of the sections to be booked is equal to or less than a prescribed value for at least one of the first moving body and the second moving body,

the number of the sections that are able to be booked at the same time for one state transition is equal to or less than a prescribed value for at least one of the first moving body and the second moving body,

the sections in a traveling direction are able to be booked while the other sections are not able to be booked for at least one of the first moving body and the second moving body,

the sections up to a prescribed value counted from the currently present section in a traveling direction are able to be booked while the other sections are not able to be booked for at least one of the first moving body and the second moving body.

[Claim 10]

A program that causes a computer to execute:

constructing a group of a plurality of environment models with different states, each of which is constituted by a track divided into a plurality of sections, a first moving body that is a control target moving on the track, and a second moving body other than the control target, a state of which is determined by the sections where the first moving body and the second moving body are present and the sections booked for the first moving body and the second moving body, by changing the booking of the sections for the first moving body and the second moving body, cancellation of the booking, the sections where the first moving body and the second moving body are present after moving from the booked sections to other booked sections, and the sections booked for the first moving body and the second moving body; and

searching for an order to reach a state of an environment model that satisfies a request for moving the first moving body to a prescribed section that is a goal without bringing the first moving body into a deadlock state with respect to the second moving body while changing a state of an environment model included in the group to a state of another environment model,

wherein in the searching of the order, the searching is performed with transition to the state of the environment model that matches a prescribed restriction condition on the basis of the restriction condition regarding restricting reservation of the section for at least one of the first moving body and the second moving body,

wherein the restriction condition is one or more of:

the number of the sections to be booked is equal to or less than a prescribed value for at least one of the first moving body and the second moving body,

the number of the sections that are able to be booked at the same time for one state transition is equal to or less than a prescribed value for at least one of the first moving body and the second moving body,

the sections in a traveling direction are able to be booked while the other sections are not able to be booked for at least one of the first moving body and the second moving body,

the sections up to a prescribed value counted from the currently present section in a traveling direction are able to be booked while the other sections are not able to be booked for at least one of the first moving body and the second moving body.