Claims

[Claim 1]

A system comprising:

a planning section that generates a production plan for a production site by using a planning model used to generate the production plan for the production site;

a simulating section that simulates operation of at least a portion of the production site, based on a simulation model to simulate the at least a portion of the production site;

a monitoring section that monitors actual operation of the at least a portion of the production site;

a calibrating section that calibrates the simulation model, based on a difference between the simulated operation and the actual operation; and

an updating section that updates the planning model, in response to the calibration of the simulation model.

[Claim 2]

The system according to Claim 1, wherein

the planning model is a linear programming model.

[Claim 3]

The system according to Claim 2, wherein

the updating section updates at least one coefficient in a first-order expression used in the linear programming model.

[Claim 4]

The system according to Claim 3, wherein

the planning model and the simulation model include a common parameter, and

the updating section updates the at least one coefficient corresponding to the common parameter.

[Claim 5]

The system according to any one of Claims 1 to 4, wherein

the simulating section simulates the operation of the at least a portion of the production site by inputting an update parameter for updating the planning model into the simulation model that has been calibrated, and

the updating section updates the planning model based on a simulation result obtained using the update parameter.

[Claim 6]

The system according to any one of Claims 1 to 5, wherein

the simulation model is a steady state model.

[Claim 7]

The system according to any one of Claims 1 to 6, wherein

the simulating section simulates operation of one process unit at the production site.

[Claim 8]

The system according to any one of Claims 1 to 6, wherein

the simulating section simulates operation of a group of a plurality of process units at the production site.

[Claim 9]

The system according to any one of Claims 1 to 8, wherein

if the difference exceeds a predetermined threshold value, the calibrating section calibrates the simulation model.

[Claim 10]

The system according to any one of Claims 1 to 9, further comprising:

a detecting section that detects deterioration or improvement of the at least a portion of the production site, based on a parameter that has been calibrated in the simulation model.

[Claim 11]

The system according to any one of Claims 1 to 10, further comprising:

a judging section that judges whether to change a structure of the planning model, based on a difference between the production plan and the actual operation.

[Claim 12]

The system according to any one of Claims 1 to 11, wherein

the production site includes a refinery that produces a plurality of petroleum products by refining crude oil.

[Claim 13]

The system according to Claim 12, wherein

the at least a portion of the production site includes at least one of a crude distillation unit,

vacuum distillation unit, naphtha hydrotreating unit, catalytic reforming unit, benzene extraction unit, kerosene hydrotreating unit, diesel desulfurization unit, heavy oil desulfurization unit, fluid catalytic cracking unit, FCC gasoline desulfurization unit, thermal cracking unit, hydrocracker unit, or asphalt production unit.

[Claim 14]

A method comprising:

generating a production plan for a production site by using a planning model used to generate the production plan for the production site;

simulating an operation of at least a portion of the production site, based on a simulation model to simulate the at least a portion of the production site;

monitoring actual operation of the at least a portion of the production site;

calibrating the simulation model, based on a difference between the simulated operation and the actual operation; and

updating the planning model, in response to the calibration of the simulation model.

[Claim 15]

A program that, when executed by a computer, causes the computer to function as:

a planning section that generates a production plan for a production site by using a planning model used to generate the production plan for the production site;

a simulating section that simulates an operation of at least a portion of the production site, based on a simulation model to simulate the at least a portion of the production site;

a monitoring section that monitors actual operation of the at least a portion of the production site;

a calibrating section that calibrates the simulation model, based on a difference between the simulated operation and the actual operation; and

an updating section that updates the planning model, in response to the calibration of the simulation model.