

Claims

1. A method of operating a facility, comprising:

(a) using a computer system that stores an application for determining a plan for the operation of the facility and a schedule for the operation of the facility in accordance with the plan;

(b) acquiring data from operational activities of the facility;

(c) aggregating the acquired data and defining a mathematical model for the aggregated data to be processed;

(d) solving the mathematical model and obtaining results, wherein the obtained results determine the plan for the operation of the facility;

(e) extracting operational data and combining the operational data with the obtained results from the mathematical model in order to apply flexible time modeling to develop feasible schedule consistent with the plan, wherein the flexible time modeling includes:

(1) defining a set of targets achievable by the schedule,

(2) defining a plurality of time segments in the schedule based upon a plurality of upcoming operational events of the facility,

(3) analyzing a portion of the schedule containing the plurality of time segments covering the plurality of upcoming operational events of the facility in order for the analyzed portion of the schedule as a whole to remain consistent with the plan obtained from the results obtained by the mathematical model and with the defined set of achievable targets, wherein analyzing a portion of the schedule includes eliminating infeasible scheduling segments associated with the plurality of time segments, and determining optimal feasible scheduling segments;

(f) disaggregating data that pertains to the analyzed portion of the schedule and determining an updated schedule according to the disaggregated data;

(g) reapplying the flexible time modeling in step (e) and reperforming the disaggregating of data that pertains to the analyzed portion of the schedule and determining the schedule in step (f) upon occurrence of a subsequent operational event that is not accounted for in the mathematical model, and that occurs prior to implementation of the determined updated schedule;

(h) applying the application to operate the facility according to the determined plan and the updated determined schedule.

2. The method of claim 1, wherein the mathematical model is solved as a multi-period model that processes data of a plurality of time periods.

3. The method of claim 1, wherein the portion of the schedule includes an entire operational time period analyzed by the plan.

4. The method of claim 1, wherein the mathematical model includes a strategy-based optimization.

5. The method of claim 1, wherein data aggregation is performed by an average aggregation technique, a snapshot aggregation technique or a customized aggregation technique.

6. The method of claim 1, wherein data disaggregation is performed by an average disaggregation technique, a snapshot disaggregation technique or a customized disaggregation technique.

7. A computer system for determining the operation of a facility, the computer system being programmed to perform steps that comprise:

(a) using a computer system that stores an application for determining a plan for the operation of the facility and a schedule for the operation of the facility in accordance with the plan;

(b) acquiring data from operational activities of the facility;

(c) aggregating the acquired data and defining a mathematical model for the aggregated data to be processed;

(d) solving the mathematical model and obtaining results, wherein the obtained results determine the plan for the operation of the facility;

(e) extracting operational data and combining the operational data with the obtained results from the mathematical model in order to apply flexible time modeling to

develop feasible schedule consistent with the plan, wherein the flexible time modeling includes:

- (1) defining a set of targets achievable by the schedule,
- (2) defining a plurality of time segments in the schedule based upon a plurality of upcoming operational events of the facility,
- (3) analyzing a portion of the schedule containing the plurality of time segments covering the plurality of upcoming operational events of the facility in order for the analyzed portion of the schedule as a whole to remain consistent with the plan obtained from the results obtained by the mathematical model and with the defined set of achievable targets, wherein analyzing a portion of the schedule includes eliminating infeasible scheduling segments associated with the plurality of time segments, and determining optimal feasible scheduling segments;
- (f) disaggregating data that pertains to the analyzed portion of the schedule and determining an updated schedule according to the disaggregated data; and
- (g) reapplying the flexible time modeling in step (e) and reperforming the disaggregating of data that pertains to the analyzed portion of the schedule and determining the schedule in step (f) upon occurrence of a subsequent operational event that is not accounted for in the mathematical model, and that occurs prior to implementation of the determined updated schedule.

8. The computer system of claim 7, wherein the mathematical model is solved as a multi-period model that processes data of a plurality of time periods.

9. The computer system of claim 7, wherein the portion of the schedule includes an entire operational time period analyzed by the plan.

10. The computer system of claim 7, wherein the mathematical model includes a strategy-based optimization.

11. The computer system of claim 7, wherein data aggregation is performed by an average aggregation technique, a snapshot aggregation technique or a customized aggregation technique.

12. The computer system of claim 7, wherein data disaggregation is performed by an average disaggregation technique, a snapshot disaggregation technique or a customized disaggregation technique.

13. A non-transitory machine-readable storage medium comprising instructions which, when executed by a processor, cause the processor to:

(a) use a computer system that stores an application for determining a plan for the operation of the facility and a schedule for the operation of the facility in accordance with the plan;

(b) acquire data from operational activities of the facility;

(c) aggregate the acquired data and defining a mathematical model for the aggregated data to be processed;

(d) solve the mathematical model and obtaining results, wherein the obtained results determine the plan for the operation of the facility;

(e) extract operational data and combining the operational data with the obtained results from the mathematical model in order to apply flexible time modeling to develop feasible schedule consistent with the plan, wherein the flexible time modeling includes:

(1) defining a set of targets achievable by the schedule,

(2) defining a plurality of time segments in the schedule based upon a plurality of upcoming operational events of the facility,

(3) analyzing a portion of the schedule containing the plurality of time segments covering the plurality of upcoming operational events of the facility in order for the analyzed portion of the schedule as a whole to remain consistent with the plan obtained from the results obtained by the mathematical model and with the defined set of achievable targets, wherein analyzing a portion of the schedule includes eliminating infeasible scheduling segments associated with the plurality of time segments, and determining optimal feasible scheduling segments;

(f) disaggregating data that pertains to the analyzed portion of the schedule and determining an updated schedule according to the disaggregated data; and

(g) reapplying the flexible time modeling in step (e) and reperforming the disaggregating of data that pertains to the analyzed portion of the schedule and determining the schedule in step (f) upon occurrence of a subsequent operational event

that is not accounted for in the mathematical model, and that occurs prior to implementation of the determined updated schedule.

14. The non-transitory machine-readable storage medium of claim 13, wherein the mathematical model is solved as a multi-period model that processes data of a plurality of time periods.

15. The non-transitory machine-readable storage medium of claim 13, wherein the portion of the schedule includes an entire operational time period analyzed by the plan.

16. The non-transitory machine-readable storage medium of claim 13, wherein the mathematical model includes a strategy-based optimization.

17. The non-transitory machine-readable storage medium of claim 13, wherein data aggregation/disaggregation is performed by an average aggregation technique, a snapshot aggregation technique or a customized aggregation technique.