CLAIMS

1. A tuning system [10] for improving operation of a plant [12a-12n], the tuning system [10] comprising:

a server [14] coupled to the tuning system [10] for communicating with the plant [12a – 12n] via a communication network [16];

a computer system [18] having a web-based platform for receiving and sending plant data related to the operation of the plant [12a-12n] over the network[16];

a display device [20] for interactively displaying the plant data;

an interface module [24] for providing an interface between the tuning system [10], one or more internal databases [26], and the network [16];

a reconciliation unit [22] configured for:

i. receiving the plant data from the plant [12a-12n] via the computer system [18], the received plant data represent actual measured data from equipment in the plant [12a-12n] during predetermined time period or set points;
ii. reconciling the actual measured data from the plant [12a-12n] by comparing data received from a process model based on a set of predetermined reference or set points, thereby generating reconciled measured data, wherein the reconciled measured data is input into a tune flowsheet to generate a predicted data, wherein the tune flowsheet is a collection of process model objects as a unit of process design;

an optimization unit [30] configured for:

i. receiving the actual measured data from the plant [12a-12n]; and
ii. correcting the actual measured data for overall mass balance closure, the corrected actual measured data is used as an input to a simulation engine, wherein the process model is tuned to ensure the simulation engine matches the reconciled measured data, wherein the tuned process model serves as a basis for an optimization case, which is run with a set of the reconciled measured data as an input, the output from the optimization case is optimized data;

a prediction unit [28] configured for determining trustworthiness score of the process model by weighing differences between the model data and the reconciled measured data that are cumulatively collected over a predetermined period of time and corresponding predetermined threshold values, using an analytic technique, and thereby creating a scoring model based on at least one plant operational parameters, the scoring model serves as a basis for adjusting and tuning the process model;

wherein the reconciliation unit [22] performs a heuristic analysis against the actual measured data and the process model result using a set of predetermined threshold values.

2. The tuning system of claim 1 wherein the scoring model is updated with a weighted trustworthiness score, and the current process model is adjusted or tuned based on the scoring model.

3. The tuning system of claim 1, wherein the optimization unit [30] configured for optimizing at least a portion of the plant [12a-12n] based on a trustworthiness score of the plant model, and

wherein the optimization unit [30] defines an objective function as a user-defined calculation of a total cost of the operation during a particular process, including materials consumed, products produced, and utilities utilized, subject to at least one constraint.

4. The tuning system of claim 1, further comprising an analysis unit [32] configured for determining an operating status of the plant [12a-12b] based on a least one of: a kinetic model, a parametric model, an analytical tool, and a related knowledge and best practice standard.

5. The tuning system of claim 4, wherein the analysis unit [32] determines a target operational parameter of a final product of the plant [12a-12n] based on at least one of: an actual current operational parameter and a historical operational parameter.