

Optimize^{IT}

Optimize^{IT} Inferential Modeling Platform (IMP)



All the hype around the Information Technology Age is basically about the importance of having the right information available at the right moment. No wonder that being exposed to thousands of data results to be as much frustrating as getting no information at all. In Process Automation this common sense consideration translates in the need of converting the huge amount of process data, collected and stored in the IT plant infrastructure, into a handful of manageable, relevant, timely and accurate information crucial for plant performance optimization.

Optimize IT Inferential Modeling Platform (IMP) is a software package designed and developed to allow a straightforward and efficient “distillation” of process data into real insight, valuable production information. It includes a collection of state-of-the-art data-processing and modeling technologies

integrated in such a way to unleash all of their potential while hiding the unnecessary mathematical details.

IMP unmatched modeling functionalities places it as a front-runner for offline development and online implementation of Inferential Measurements. Inferential Measurements use available process signals to estimate process properties that are impossible to measure directly or are measured infrequently.

The estimate is calculated using a process model, which could be based on different technologies. Using the empirical approach, models are built from plant live data; there is no need to know the details of the modeling equations or of the equation parameters. In many cases, non-linear modeling techniques (as Neural Networks) have proved to be the most efficient solutions to accurately predict process behavior.



A proper processing of plant data is also able to "dig-out" and unveil hidden, essential information about plant operation. IMP includes technologies like SPC and MvSPC able to concisely capture and disclose how the production process is doing and where is heading.

IMP Overview

Optimize IT Inferential Modeling Platform is a native Windows, client-server software package for the offline development and online deployment of inferential models. The software product includes distinct offline (IMP Model Builder) and online (IMP Real-Time Server) software components.

IMP Model Builder

The IMP approach to Inferential calculation is to create a platform for Process Engineers, where all the functionalities are available, easy to be used and arranged for the best workflow.

The biggest concern when working on data-driven technologies is that data are misleading because of outliers or unnecessary signals. IMP makes available many built-in functions for Data Processing:

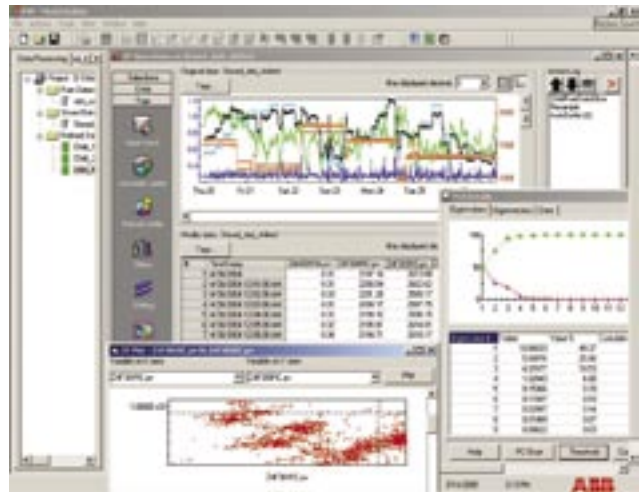
- Data import from different sources
- Data handling (data set merging and splitting, data editing, calculated tags, etc.)
- Data analysis (statistical analysis, principle component analysis, etc.)
- Automatic outlier removal
- Multi-chart (2D and 3D) visualization facility

Pre-processed data can then be used to build either empirical models or baseline for statistical control purposes.

IMP makes available several powerful modeling technologies, including:

- Multi-layer adaptive Neural Networks
- Feedforward Neural Networks
- Genetic Networks
- Multi-linear regressions
- PLS regressions
- Locally Weighted Regressions

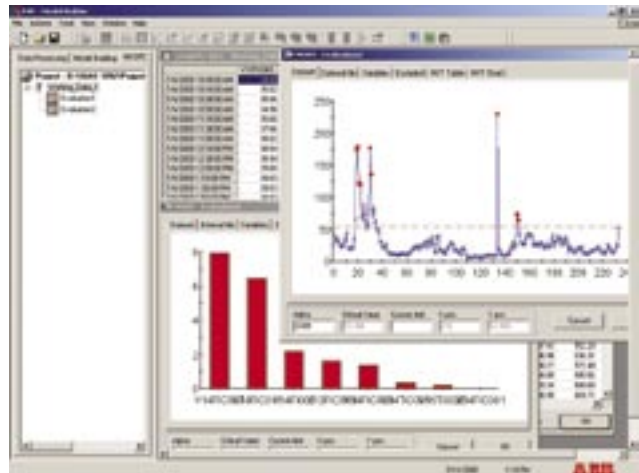
Built-in wizard and functions are available to automate the most common tasks.



IMP data processing workspace

As an example, the best selection of model inputs can be identified by means of powerful built-in wizards or through use of the dedicated a scripting language.

Additionally, Optimize IT Inferential Modeling Platform allows implementation of Multivariate Statistical Process Control strategies and SPC Charts. MvSPC compares process operative conditions with defined baseline data and provides a metric to express the magnitude of the distance between actual process operation and the most common one.



MvSPC evaluation tab

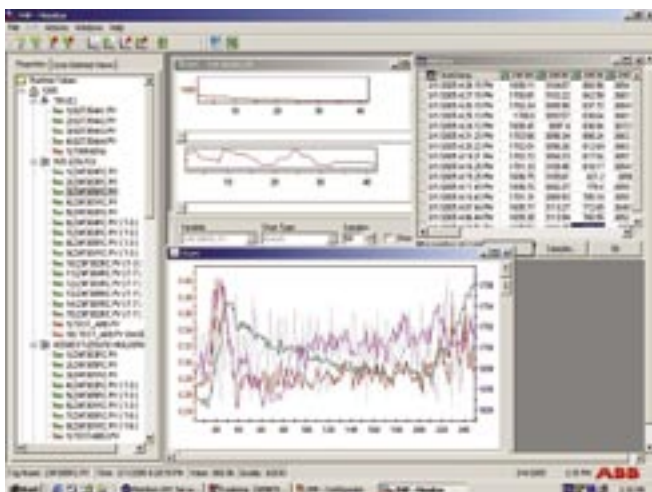
Once a model has been built and validated, it can be both used on-line through the IMP on-line facilities for delivering timely and accurate predictions. Additionally it can be exploited off-line for what-if analysis and sensitivity studies by means of the built-in Model Explorer utility.

IMP Real-Time Server

Optimize IT Inferential Modeling Platform online environment provides the deployment platform for developed models and statistical evaluation. Real-time estimation is performed by direct connection to plant DCS or PLC through OPC, using IMP built-in OPC Client.

The environment features an open client-server architecture that allows deployment of models built with IMP Model Builder; additionally, IMP Real-Time Server allows implementation of calculations (through a scripting language) and custom, proprietary models through use of DLLs.

IMP Real-Time Server allows use of multiple IMP Monitor modules to monitor and command IMP applications. Configuration of IMP Real-time Server is designed through use the dedicated IMP Configurator module.



IMP monitor

Field-proven, built-in functions provide statistical analysis of Inferential Measurement performances.

Periodic recalibration of inferential models through use of Laboratory data is available by means of built-in bias handling functions.

IMP target application

IMP typical applications are common in a wide range of industries from Refineries to Polymerization plants, from Utilities to Pharmaceutical units. Statistical monitoring and inferential measurements can very often applied together in a perfect synergy.

Applied in conjunction with Optimize IT Predict & Control, the innovative ABB multivariable controller, IMP is able to unleash all the power and profitability of Advanced Process Control strategies at a fraction of the typical cost.

IMP Features

Modeling Technologies

- Multi-layer adaptive neural networks
- Feedforward neural networks
- Genetic networks
- Multi-linear regressions
- PLS regressions
- Locally weighted regressions

Statistical Process Analysis

- PCA
- SPC
- MvSPC

IMP Environments

IMP Model Builder

- Data import
- Data processing
- Automation outlier removal
- Datasets and input selection wizards
- Automatic multiple model development
- Model assessment and comparison
- Model explorer
- SPC and MvSPC development

IMP Real-Time Server

- Model deployment
- Control system OPC connection
- LIMS interface (ODBC, OPC)
- Inferential model or SPC/MvSPC execution
- On-line model recalibration

IMP Application Fields

- Inferential measurements
- Sensor validation
- Predictive emission monitor
- Process performance monitor
- Maintenance trigger
- Off-line what-if analysis

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