

Services & Systems

Services

- Consulting
- Process analyses
- Computation of neural networks
- Process optimization with modern controls systems (fuzzy controls)
- Optimization of flue gas treatment
- Combustion performance controls
- Emissions reduction through expert-based system controls
- Throughput and efficiency increases for combustion processes
- Combination of individual processes from combustion and flue gas treatment
- Thermodynamic equilibrium modeling
- Expert opinions for energy requirements and system operations
- Basic and detail engineering
- Commissioning
- Service and maintenance, online / offline

Systems

Our services are based on industrially proven hardware and software and are compatible with all conventional controls systems.

Using standardized interfaces, a combination with running systems is made possible, with no impact on system operations. For newly planned systems, integration in the controls system makes sense.



INP International Projects is a group of globally acting engineering companies focusing on the process control, electrical energy technology, automation and thermal process engineering industries. We are an independent service provider with offices in Germany, Switzerland, Austria, South Africa and the USA. For more than 20 years we have been a flexible and reliable partner for companies in the fields of: power plants, power technology, iron/steel industry, and industrial automation.

The core services of our highly qualified engineers are consulting, engineering, U.S. services, as well as commissioning for national and international projects. We generate feasibility studies and optimization analyses, and provide well-grounded technical consulting. In addition to basic and detail engineering, we provide our own internal test facility and additional technical services, such as construction site management, installation management, and commissioning, as well as international personnel provision. INP International Projects employs 250 people, with a total of five locations in Germany, Switzerland, Austria, the USA, and South Africa.



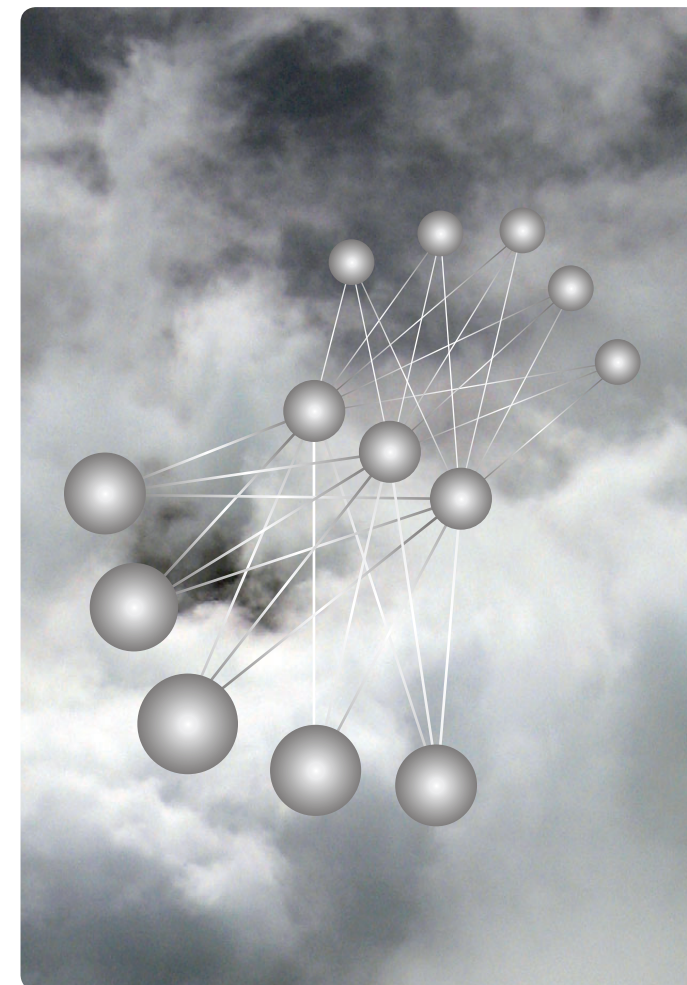
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Energy Optimization of power grids in a plant network





INP Fuzzy Control - overarching controls systems for power grids in a plant network

The basic problem in an power grid

A system with various steam buses and high and low pressures is subject to the changing effects of steam boilers, electric generators, steam consumers, etc. When operating such an energy system, variations in demand or additional steam requirements must be controlled as efficiently as possible, such as by diverting steam flows, or adding or removing additional boilers.

In order to achieve this goal, the use of INP Fuzzy Control as an over-arching unit is notably suitable for use in power grids.

Additional goals may be:

- Adjustment to changed quantities of steam
- Maximum flow of available steam
- Overarching steam network controls
- Coupling partial system components for quiet, stable system operations
- Achievement of low variation in HP steam networks
- Operations with low impact on boilers and systems, while maintaining safety functions
- Smooth transition from conventional to fuzzy controls, and vice versa

How does INP Fuzzy Control work

INP Fuzzy Control is a rule-based expert system. It makes decisions based on the information available (measured variables) and recorded rules (expert knowledge). This expert knowledge is captured in audits with the system personnel. Extensive data documentation contains all the operating states (partial load, average load, and full load). Essential control and regulation decisions are derived from these. This basic version of fuzzy controls is compared with actual operating data, and new or missing information is added, then everything is remodeled into a final fuzzy control.

Potential of INP Fuzzy Control

- Increased operating results with no technical system modifications: combustion power controls, steam quantities, electrical generation, district heating decoupling, system throughput
- Reduced operational variations
- Better utilization of technical system potential
- Automation of manual processes
- Integration in existing or new controls systems
- Maintenance of system safety functions

More reliability in optimization, using simulations

An extension of the INP Fuzzy Control development methodology that makes sense especially for complex systems is a technical controls simulation. When planning new construction, renovations, expansions, or optimizations of process engineering systems, questions often arise that are difficult to answer, but can be easily resolved by means of dynamic process simulation. In addition to system behavior and performance with regard to product quality or raw material consumption, controls behavior in case of faults or load changes are of great interest.

What can a system simulation provide?

- Planning and checking of system performance
- Forecast of time behavior of the system
- Representation of the functions of controls loops and controls quality
- Use of system simulation for training purposes prior to completion of commissioning
- Improvement in system behavior in case of faults by optimizing safety controls in “dry training”
- Direct comparison of different solution approaches
- Identification of optimization potentials
- Shorter commissioning times
- Time and cost savings

When does a system simulation make sense?

- Modification and/or optimization of combustion systems
- Optimization of dynamic behavior in hydraulic systems (steam networks, district heating networks, air, gas, water, or product lines)
- Expansion of production systems
- Decision-making aid in selecting alternative technologies
- Optimization of chemical processes and process management
- Thermodynamic operations
- Optimization of reactor design and geometry
- Forecast of product quality under various process parameters or operation modes