

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.

What is fuzzy logic?

The roots of fuzzy logic go back to ancient Greece. The philosopher Plato proposed that there was a third area between "true" and "false". Fuzzy set theory was developed as early as 1965, but was not taken seriously amidst the euphoria surrounding computers. It gained momentum in Japan in the 1980s, as a fully automated subway train, the first large-scale application of fuzzy logic, demonstrated the capabilities of such a system. Today, fuzzy logic is mainly used in controls for machines, robots, or even household devices.

The strategy followed by fuzzy systems is to be able to process information, even if it is vague and incomplete. In fuzzy logic, linguistic fuzziness is often dealt with, for example with terms such as warm, hot, cold, fast, slow, etc. This is often appreciated by people, since fuzzy logic makes it possible to almost directly apply experiences that can be described in words, without needing extensive mathematical modeling by computers.



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.



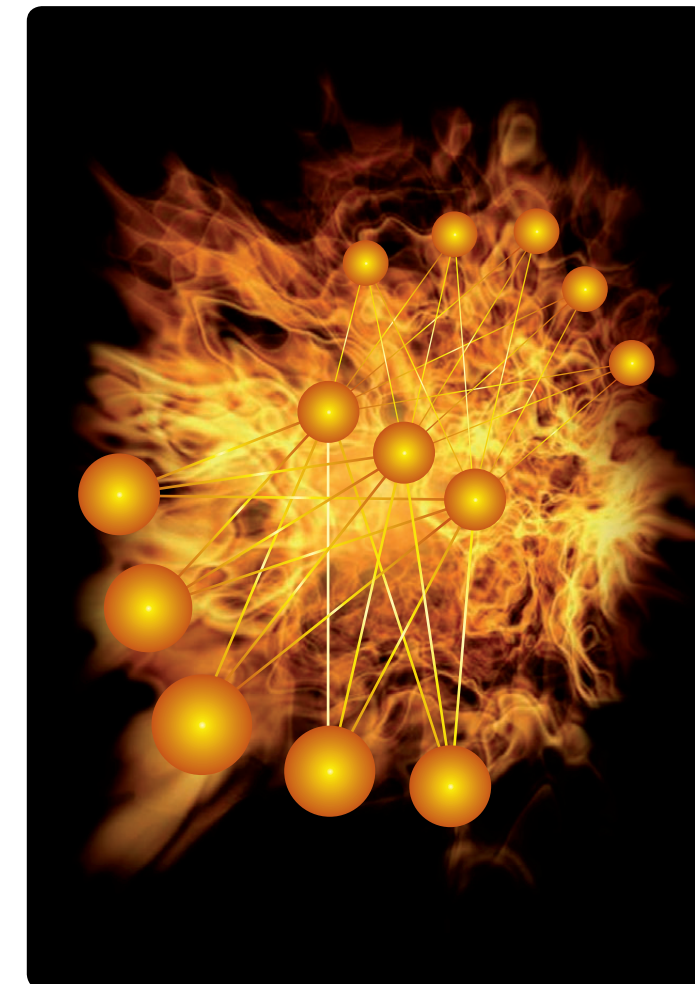
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Thermal process engineering with INP Fuzzy Control





Know-how and innovations

Energy efficiency with fuzzy logic

Energy efficiency is one of the central questions of the future. This is one reason why we, as a company, have already addressed the subject in advance. Our many years of experience in process controls engineering and process engineering for power plants were helpful in this regard. Through close contact with colleges and research facilities, we have been able to generate new, practical applications from our know-how and from innovative technologies.

Market leader with INP Fuzzy Control

With "INP Fuzzy Control", we brought to market an innovative solution for combustion power optimization based on fuzzy logic. In this area of innovative combustion power controls in waste incineration systems, we are taking the lead in Europe.

Fuzzy in combustion power optimization

Conventional controls engineering often reaches its limits in waste incineration, due to the complexity of the processes. In order to achieve the best possible combustion power, the waste infeed and air mass ratios must be continuously adapted to one another. So far, this has required frequent manual overriding in many waste incineration systems. Experienced system operators observed the combustion process and modified the air or waste inflows as needed. Manual overrides of controls systems function fairly well, but do leave tremendous room for efficiency improvements.

INP Fuzzy Control provides an innovative solution. The basic idea of fuzzy controls systems is to apply the knowledge and experience of system operators in the system control. Using a fuzzy system, for example, the verbal measurement "a little too hot" can be de-fuzzified, or transformed, into the concrete value of 860 degrees combustion chamber temperature. Finally, fuzzy controls contain the collected knowledge of the system personnel, with whose help the combustion process in the waste incineration system is controlled.

Economic and environmental engineering potential

In the course of increasingly stringent legal requirements for emission protection and rising economic pressures, innovative and sustainable solutions are increasingly in demand for cost reduction with simultaneous increases in efficiency. The potential of a fuzzy logic-controlled combustion system is most significant for older systems. Waste throughput, and thus waste heat values, can be increased without compromising system safety. Pollutant generation is minimized at the same time. Besides the environmental engineering improvements, the use of INP Fuzzy Control also has tremendous economic potential. More consistent combustion power means a greater level of efficiency in combustion and steam generation, and thus an increase in power. The resulting minimization of pollutants, in turn, is the most important factor in preventing corrosion of all system components. Breakdowns due to corrosion become less frequent and the extent of overhauls is noticeably reduced.

Further applications for fuzzy logic

The bandwidth of possible applications for fuzzy logic is extensive. The use of fuzzy logic makes sense wherever fuzzy information, such as speech, must be processed semantically, or in complex systems with unknown interrelationships where predictions must be made. Consequently, there is an array of applications for fuzzy logic:

Fuzzy logic promises great potential for improvement, with regard to efficiency increases and reduced material wear, in controls for steam systems, feedwater controls, optimization of sewer technology, in image processing and data analysis, and much more.

Besides complex industrial control tasks, fuzzy logic is also used to an increasing degree in consumer goods. Examples include video cameras that automatically compensate for people's shaking motions; washing machines that automatically adjust to the level of dirtiness of the laundry; or even small handheld computers that can recognize handwriting.

Without fuzzy controls systems ...

- ... an Airbus A380 would never get off the ground
- ... we would no longer launder clothes properly
- ... we would not have any mobile phones in use

- ... we would have to do without some level of comfort and safety systems in our cars
- ... we would not be able to take any sharp pictures