

# PREDICTIVE CONTROL OF RADIANT HEATING/COOLING SYSTEMS

## *Heating and cooling control based on a weather prediction and mathematical model of heat transfer in a building.*

Model Predictive Control (MPC) is a bright new approach in regulation, where the control system is able to predict heat transfer in a building and offers lowering of heating/cooling cost in accordance with keeping or increasing of comfort. **Financial savings could be up to 25%.**

### Current situation

During the installation of heating/cooling control system of a building, a basic identification of building parameters is performed e.g. „how fast could be the building heated/cooled on selected setpoint“. These parameters are not static but and they are changing dynamically with changing weather conditions (e.g. ambient temperature, solar radiation) and inside conditions (e.g. number of persons in the building, installed devices in the building and their usage). These facts are usually not correctly used during the commissioning of the control system.

### Our solution

Our MPC algorithm eliminates mentioned pitfalls. The MPC predicts heat transfer in a building and the results are used for tuning of regulation parameters. This approach minimises demanded heating/cooling energy and ensures thermal comfort.

### Advantages

- **Energy savings up to 25%** - thanks to more precise regulation.
- No unnecessary overheating or overcooling of a building.
- Better thermal comfort even in cases of problematic radiant heating/cooling systems e.g. TABS or Crittall

### Main differences between the MPC and traditional regulators:

- **Weather prediction:** MPC downloads weather prediction (for at least next 24h) in regular intervals
- **Model of the heat transfer:** a complex unique model of a building, which contains information about heat transfers from heat sources, outside environment and sun into building zones and rooms
- **Inner temperatures measurement:** the MPC contains a feedback loop from inner temperature measurements. In traditional regulators, the heating regulation is based only on outside temperature measurement and timers.

