

## Optimisation of the Start-Up Process of a Multi-Stage Evaporation System

Evaporation processes are of great importance in the chemical industry. They are commonly used to concentrate a solution containing the desired product. In most cases the solvent is either water or an alcoholic solvent, and heat is supplied by condensing steam. The dynamics of an evaporator is described by differential algebraic equations, where differential equations correspond to the mass and energy conservation laws. A challenging feature of evaporation processes is their hybrid behaviour. Due to phase transitions, the dynamics of the evaporator drastically changes exhibiting both structural transformations and state jumps. Hence, an evaporation system should be modelled and analysed in the framework of hybrid control systems.

The proposed topic deals with the problem of start-up of a multi-stage evaporator. Obviously, this problem is rather complicated because of the system complexity. Thus, the design procedure will include not only control-theoretical, but also numerical analysis of the system under consideration<sup>1</sup>. Moreover, understanding of a physical nature of the underlying processes is extremely helpful.

**Requirements:** courses in Control Engineering (not very deep), Numerical Methods, Physics (basic level).

**Working languages:** English, German.

**For further information please apply to:**

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<sup>1</sup>The numerical analysis and simulation are being performed with gPROMS© (see <http://www.psenterprise.com/gproms/>)