

## Towards online transient simulation of a real heat pump

**Mariusz Zamojski, Paul Summerauer, Christoph Bacher, Fadi Dohnal**

*Abstract:* Efficiency and flexibility are key aspects of modern heat pumps for the household. A nonlinear model of the refrigeration cycle is developed in the framework of Matlab/Simulink that will allow for simulation and control design of multiphase fluid dynamics of an existing heat pump. The complexity of the model is balanced against the calculation speed since the ultimate aim is to embed the model-predictive capability in existing products. A finite difference model of the evaporator and the condenser is tuned and benchmarked against real measurements at stationary operation. This capability is the basis for transient startup and shutdown dynamics which enables robust model-predictive control design.

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<sup>1)</sup> Mariusz Zamojski, M.Sc. (Ph.D. student): UMIT, Linker Iselweg 21, 9900 Lienz, Austria (AT), mariusz.zamojski@umit.at.

<sup>2)</sup> Paul Summerauer, M.Sc.: IDM Energiesysteme GmbH, Seblas 16 - 18, 9971 Matrei in Osttirol, Austria (AT), paul.sumerauer@idm-energie.at.

<sup>3)</sup> Christoph Bacher, M.Sc.: IDM Energiesysteme GmbH, Seblas 16 - 18, 9971 Matrei in Osttirol, Austria (AT), christoph.bacher@idm-energie.at.

<sup>4)</sup> Fadi Dohnal, Professor: UMIT, Linker Iselweg 21, 9900 Lienz, Austria (AT), fadi.dohnal@umit.at.