

Towards online transient simulation of a real heat pump

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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 volume 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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