

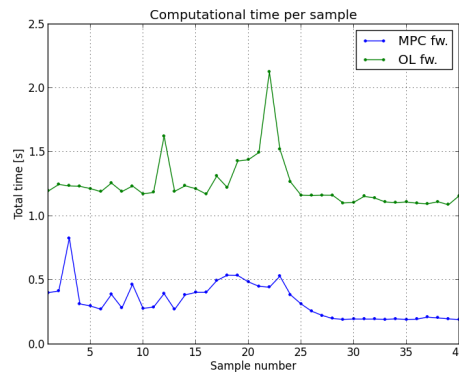
# A Framework for Nonlinear Model Predictive Control in JModelica.org

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Nonlinear Model Predictive Control (NMPC) is a control strategy based on repeatedly solving an optimal control problem. In this paper we present a new framework for the JModelica.org platform, developed specifically for use in NMPC schemes. JModelica.org is an open-source software for simulation, optimization and analysis of complex dynamic systems described by Modelica models. The new framework, the *MPC framework*, utilizes the fact that the structure of the optimal control problem to be solved does not change between solutions, thus decreasing the computation time needed to solve it. The new framework is compared to the old optimization framework, the *open-loop framework*, in JModelica.org in regards to computation time and solution obtained through a benchmark on a combined cycle power plant. The results show that the MPC framework obtains the same solution as the open-loop framework, but in less than half the time.



**Figure 1.** Total computation time for each sample in the benchmark, using the MPC framework and the open-loop framework respectively.

For the benchmark system presented in this article, the total computation time for each sample was decreased by an average of 70 %, as shown in Figure 1. The MPC framework also includes some features which makes JModelica.org easier to use for NMPC applications.