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Title: A Framework for Aperiodic Model Predictive Control

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Abstract: The potential efficacy of a Cyber-Physical System is limited by the necessity of large bandwidth and restrained energy consumption requirements. In the proposed approach a novel event-triggered strategy for a well-known control methodology, namely Model Predictive Control (MPC), is presented. Using this framework in the discrete-time domain, one can efficiently control a large number of subsystems that communicate sharing state information, while decreasing the overall energy consumption. More specifically, the most common approach for MPC schemes until now is the computation of the control law at each time-step. The MPC law requires solving an optimal control problem that is in fact a rather computationally demanding task. However, in this approach the control law is computed and updated only when it is needed, thus rendering the whole framework more intelligent and less demanding in terms of energy.