



**INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS**

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SHORT ABSTRACT

Predictive control has gained much popularity since its introduction in the 1960s. The popularity of these controllers is mainly due to their easy handling of constraints, multi-input multi-output system and control of non-linear plants, which are usually properties of an actual industrial plant. In this thesis, a type of predictive controller that is, generalized predictive control (GPC), is considered for analysis. Modelling, design and tuning of GPC are presented in this thesis for the DC-DC buck converter. The controller design procedure is verified by implementing voltage mode control (VMC) of the DC-DC Buck converter for inactive constraints. The implemented algorithm is verified using numerical simulation and hardware implementation of the pre-computed control algorithm. The performance of observer-based GPC has also been demonstrated in numerical simulation results for dual output DC-DC buck converter.