

CONTROLLERS FOR AMPLITUDE LIMITED MODEL ERROR MODELS

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We consider systems where information about model accuracy is contained in a model error model. There are many classical results how the gain of such a model error model can be combined with robustness properties of a regulator for the nominal system model to secure stability and performance when the regulator is applied to the true system. The small gain theorem is a typical example.

For a linear true system and a linear model (giving a linear model-error model) this gives a clear and appealing method for designing robust control systems, since the gain (or frequency response) of the error model can be estimated in principle.

For a nonlinear true system the situation is more difficult. The validity of an error model is typically restricted to input signals that are limited in amplitude, or constrained in other ways.

It is then natural to require the same input restriction applies when designing controllers. This means that it would be desirable to define the model error gain only in the restricted class of inputs. Also, modifications of the regulator that follow from constraining the input signal will have to be considered.

In this presentation, a framework for dealing with such an input constrained, robust control design will be discussed.

¹Joint work with S. T. Glad, A. Helmersson, and M. Enquist