

# Greedy Controllability of Reduced-Order Linear & Dynamical Systems

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**Abstract:** Often a dynamical system is characterized by one or more parameters describing physical features of the problem or geometrical configurations of the computational domain. As a consequence, by assuming that the system is controllable, corresponding to different parameter values, a range of optimal controls exists. The goal of the proposed approach is to avoid the computation of a control function for any instance of the parameters. The greedy controllability [1] consists in the selection of the most representative values of the parameters that allows a rapid approximation of the control function for any desired new parameter value, ensuring that the system is steered to the target within a certain accuracy. By proposing the Reduced Basis method [2] (an efficient model order reduction technique) in this framework, the computational costs are drastically reduced and the efficiency of the greedy controllability approach is significantly improved.

## References:

- [1] M. Lazar, E. Zuazua Greedy controllability of finite dimensional linear systems *Automatica*, (Journal of IFAC) Vol. 74 Issue C, pp. 327–340, 2016.
- [2] J.S.Hesthaven, G. Rozza, B. Stamm, *Certified Reduced Basis Methods for Parametrized Partial Differential Equations*, SpringerBriefs in Mathematics, 2016.

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