

Introduction to optimal control problems under uncertainty

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Abstract

Optimal Control Problems (OCPs) constrained by deterministic Partial Differential Equations (PDEs) have been extensively studied in the last decades since they are essential tools in the design of complex engineering systems. However, the physical system under study is often affected by uncertainties, either due to a lack of knowledge on some parameters defining the model or due to an intrinsic randomness. To have more reliable results, it is important to account for the ubiquitous uncertainty in nature by considering OCPs constrained by random PDEs, which belong to the class of OCPs Under Uncertainty (OCPUU).

In this lecture, we will give an overview of random PDEs and of general formulations of OCPUU. If time permits, we will further cover their well-posedness analysis and efficient numerical methods.