

Space-time FEM for distributed optimal control problems subject to the wave equation with state or control constraints

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In this talk, we will briefly recall a unified abstract framework for the treatment of distributed optimal control problems subject to PDEs. Then, we will cast the optimal control problem subject to the wave equation with state constraints into this framework, using a space-time energy regularization. This approach will allow a full analysis of the problem at both the continuous and the discrete level.

In particular, we will provide regularization and finite element error estimates, from which we can derive an optimal relation between the regularization parameter and the mesh size, balancing accuracy and cost. Furthermore, we will demonstrate that the incorporation of control constraints into this framework requires only minor modifications.

The theoretical findings will be supported by numerical examples addressing both types of constraints.

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