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On the construction of feedback controllers for parabolic equations with an application to the control of fluid flow

A general approach for obtaining closed-loop control laws for parabolic equations is presented. It is based on the application of the instantaneous control strategie to control problems involving cost functions related to the feedback gain. One objective of the presentation is concerned with the interpretation of instantaneous control as semi-discretization method of a related system of parabolic equations. As will be outlined, this provides a systematic approach to analytical and numerical investigations of the instantaneous control method. Applications include the control of the heat equation, the in-stationary Burgers equation and the incompressible time dependent Navier-Stokes equations. The effectiveness of the approach is illustrated at numerical examples.