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Spatio-temporal feedback control of partial differential equations

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Noninvasive time-delayed feedback control ("Pyragas control") has been investigated theoretically, numerically and experimentally during the last twenty years, mostly for ordinary differential equations. In this talk, we introduce new noninvasive spatio-temporal control terms to a particular type of partial differential equations (scalar reaction-diffusion equations on the circle) with the purpose of stabilizing unstable equilibria and periodic orbits. The control terms which are directly inspired by Pyragas control fail their task of stabilization. Therefore, we construct successful new control terms, by introducing the notion of *control triples*. The control triple defines how we transform the *output signal*, *space*, and *time* in the control term. This Ansatz, especially well suited for the control of partial differential equations, does not exist in the literature so far. It incorporates the spatio-temporal patterns of the equilibria and periodic orbits into the control term.