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## Krstic, Miroslav; Smyshlyaev, Andrey

Boundary control of PDEs. A course on backstepping designs. (English) Advances in Design and Control 16. Philadelphia, PA: Society for Industrial and Applied Mathematics (SIAM). x, 192 p. \$ 89.00 (2008).

As is known, there are two main settings of control problems for PDEs, depending on where the actuators and sensors are located – "in domain" control, where the actuation penetrates inside the domain of the PDE system or is distributed everywhere in the domain and "boundary" control, where the actuation and sensing are applied only through the boundary conditions. The monograph is devoted to the second case. The method for boundary control of PDEs developed in the book is called the backstepping control method. This method represents a particular approach to stabilization of dynamical systems.

The emphasis in the monograph is on open-loop unstable PDE plants and delivering feedback laws of acceptable complexity which solve the stabilization problem without resorting the operator Riccati equations. For various classes of systems, the problems of boundary control design and observer design are discussed. In addition to developing state estimators, approaches for developing parameter estimators are also shown in the book. Focusing on linear systems, authors, nevertheless, introduce initial ideas and current results that are useful for stabilization of nonlinear PDEs.

Vyacheslav I. Maksimov (Ekaterinburg) Keywords:

boundary control; partial differential equations; open-loop unstable PDE plants; parameter estimators

## Classification :

\*\*93-02 Research monographs (systems and control)
35-02 Research monographs (partial differential equations)
35B37 PDE in connection with control problems
93C40 Adaptive control systems
74M05 Control, switches and devices ("smart materials")
76D55 Flow control and optimization