Levant, Arie

Higher-order sliding modes, differentiation and output-feedback control. (English)

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An uncertain smooth single-input single-output (SISO) control system is considered. Assuming that the relative degree r of the considered system is constant and known, a family of r-sliding controllers with finite-time convergence is developed. The controller parameters may be chosen in advance, so that only one parameter has to be adjusted in order to control any system with the same relative degree. Such controllers require higher-order real-time derivatives of the outputs. To estimate these derivatives, higher-order robust exact finite-time-convergent differentiators are proposed. Two simulation examples illustrate the presented approach.

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MSC:

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93C10 Nonlinear systems in control theory

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