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Adaptive tracking control of switched cyber-physical systems with cyberattacks. (English)

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Summary: This study investigates the problem of adaptive tracking control for switched cyber-physical systems against cyberattacks. A tracking signal is generated using an exogenous system. An adaptive tracking controller is designed to compensate for the attacks and then stabilize the studied systems. A switching signal is constructed using the mode-dependent average dwell time (MDADT) method. By using the multiple Lyapunov function approach, which is associated with the adaptive estimated signal, the closed-loop error systems with cyberattacks are asymptotically stable under the designed adaptive tracking controller and MDADT switching signal, and the system states can asymptotically track the reference signal. Finally, two examples are provided to validate the theoretical results.

MSC:

93Cxx Model systems in control theory
93Bxx Controllability, observability, and system structure
93Dxx Stability of control systems

Keywords:
cyberattacks; adaptive tracking controller; switched cyber-physical systems; mode-dependent average dwell time method

Full Text: DOI

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