

Formation control of large-scale mobile sensor networks based on semilinear parabolic system

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Abstract

This paper is concerned with the formation control problem for a class of large-scale mobile sensor networks. The dynamic of mobile sensors are modeled by class of semilinear parabolic system, which is a class of partial differential equation(PDE) and has rich geometric family. In this model, the communication topology of agents is a chain graph and fixed. Leader feedback laws which designed in a manner to the boundary control of semilinear parabolic system allow the mobile sensors stable deployment onto planar curves. By constructing appropriate Lyapunov functional and using linear matrix inequality, several sufficient criteria are derived ensuring the mobile sensor networks to be globally asymptotically stable at the equilibrium. A simulation example is provided to demonstrate the usefulness of the proposed formation control scheme.

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