

# Equilibrium and Control of Congestion Games

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This report mainly discusses the equilibrium and control issues of congestion games. Firstly, we consider the Nash equilibrium maintenance problem for a congestion game with player specific costs and resource failures. We study the impact of resource failure probability on Nash equilibrium, and obtain the sufficient conditions for the original Nash equilibrium to be maintained even after introducing resource failure. Next, we consider the stabilization problem of evolutionary congestion games. By using the semi-tensor product of matrices, the model is represented in algebraic form. By designing the state feedback control, a sufficient and necessary condition is obtained for stabilizing the game to a certain target profile. Finally, we research the demand side management and control problem of a kind of smart grids.

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