1073-91-121 **Peng Sun*** (psun@duke.edu), 100 Fuqua Drive, Box 90120, Durham, NC 27708, and **de Vericourt Francis**, **Shouqiang Wang** and **Liu Yang**. *Decentralized resource allocation to control an epidemic.*

We present two game theoretic resource allocation models on epidemic control. First, we develop a two-period multivariate Reed-Frost model to represent the spread of the epidemic within and across countries at its onset, which captures three critical sources of uncertainty: the number of initial infections, the spread of the disease, and drug efficacy. We show that for small probabilities of between-country infections, the underlying game is supermodular, Nash equilibrium exists, and there is a unique Pareto optimal equilibrium among all existing equilibria. We also identify conditions under which the optimal centralized solution constitutes a Pareto improvement over decentralized equilibria.

The second model examines how two countries allocate resources to minimize the total number of infectives in their respective populations over the entire time horizon. Assuming the initial number of infectives is small, we show in that selfish countries always allocate their resources to bring the effective reproduction ratio below one and avoid a major outbreak. When a major outbreak is avoidable, we further identify necessary and sufficient conditions under which the individual allocation decisions minimize the total number of infectives in the whole population. (Received July 29, 2011)