

Industrial and Systems Engineering Seminar

Targeting and Sequential Launching in Social Networks

Wednesday, April 16

3:15 PM – Refreshments before the Seminar

3:30 PM – Graduate Seminar

Mechanical Engineering Room 4125 A & B



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We consider a social network wherein a fixed set of players non-cooperatively determine their contributions. This setting features payoff externalities and strategic complementarity amongst players. We first analyze the two-stage game in which players in the leader group make contributions prior to the follower group. Compared with the simultaneous-move benchmark, the equilibrium contribution by any individual player in any two-stage sequential-move game is unambiguously higher. We establish the isomorphism between the socially optimal selection of the leader and follower groups and the classical weighted maximum-cut problem. We give an exact index to characterize the key leader problem, and show that the key leader can be substantially different from the key player who impacts the networks most in the simultaneous-move game. We also provide some design principles for unweighted complete graphs and bipartite graphs.

We then examine the structure of optimal mechanism and allow for arbitrary sequence of players' moves. We show that starting from any fixed sequence, the aggregate contribution always goes up while making simultaneous-moving players move sequentially. This suggests a robust rule of thumbs--any local modification towards the sequential-move game is beneficial. Pushing this idea to the extreme, the optimal sequence turns out to be a chain structure, i.e.: players should move one by one. Our results continue to hold when either players exhibit strategic substitutes instead or the network designer's goal is to maximize the players' aggregate payoff rather than the aggregate contribution. We will also touch upon the information dissemination and revenue management issues in this social network context.

Bio: Ying-Ju Chen joined the Department of Industrial Engineering and Operations Research at UC Berkeley in July 2007 after completing his PhD in Operations Management in the IOMS Department, Leonard N. Stern School of Business, New York University. He also holds master's and bachelor's degrees of Electrical Engineering from National Taiwan University. He is a recipient of NYU Teaching Excellence Award, second place of INFORMS Junior Faculty Interest Group (JFIG) paper competition, Best Paper Award of CSAMSE (third prize), the Harold MacDowell Award from Stern School, 5 time Meritorious Service Awards from Management Science and Manufacturing & Service Operations Management, and other awards and fellowships during the academic journey. His current research interests lie in socially responsible operations, operations-marketing interface, and supply chain management. His work has appeared in several leading conferences and journals in the fields of accounting, economics, electrical engineering, information systems, marketing, and operations research.