DYNAMIC BIPARTITE MATCHING MODELS

A. Bušić, INRIA and École Normale Supérieure, France, ana.busic@inria.fr
V. Gupta, University of Chicago Booth School of Business, USA, varun.gupta@chicagobooth.edu
J. Mairesse, CNRS, Univ Paris Diderot, France, jean.mairesse@liafa.univ-paris-diderot.fr

Matching models arise in many applications, such as healthcare, transportation, and energy. We consider a bipartite matching queueing model, where customers and servers play symmetrical roles. There is a finite set C, resp. S, of customer, resp. server, classes. Time is discrete and at each time step, one customer and one server arrive in the system according to a joint probability measure μ on $C \times S$, independently of the past. Also, at each time step, pairs of *matched* customer and server, if they exist, depart from the system. Authorized *matchings* are given by a fixed bipartite graph. A *matching policy* decides how to match when there are several possibilities. Customers/servers that cannot be matched are stored in a buffer. The evolution of the model can be described by a discrete time Markov chain. We study this model under various admissible matching policies including: ML (Match the Longest), MS (Match the Shortest), FIFO (match the oldest), RANDOM (match uniformly), and PRIORITY.