

SERVICE SYSTEMS WITH SKILL BASED ROUTING, UNDER FCFS POLICIES

I.J.B.F. Adan, Eindhoven University of Technology, The Netherlands, i.j.b.f.adan@tue.nl

M.A.A. Boon, Eindhoven University of Technology, The Netherlands, m.a.a.boon@tue.nl

G. Weiss, University of Haifa, Israel, gweiss@stat.haifa.ac.il

We study an overloaded service system with servers of types $\mathcal{S} = \{s_1, \dots, s_J\}$, serving customers of types $\mathcal{C} = \{c_1, \dots, c_I\}$ under FCFS. Customers arrive in Poisson streams, join the queue and then abandon or get served. Service is skill based, which is described by a graph G , where $(i, j) \in G$ if server type s_j is trained to serve customer type c_i . The service duration depends on both server and customer type. At this level of generality, the design in terms of staffing and cross-training decisions is a challenging problem. Based on recent results on infinite matching and on some asymptotic assumptions, we propose an algorithm to determine, for given data, the required levels of staffing to meet target levels of service quality and labor division. The algorithm is validated through a systematic simulation study, showing that it is remarkably robust and accurate. As such, we believe that the algorithm will prove to be useful in aiding the design and effective operation of complex systems with skill based routing.