

**DIFFUSION APPROXIMATIONS FOR CONTROLLED STOCHASTIC
NETWORKS: AN ASYMPTOTIC BOUND FOR THE VALUE
FUNCTION.**

by

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ABSTRACT

We consider the scheduling control problem for a family of unitary networks under heavy traffic, with general interarrival and service times, probabilistic routing and infinite horizon discounted linear holding cost. A natural non-anticipativity condition for admissibility of control policies is introduced. The condition is seen to hold for a broad class of problems. Using this formulation of admissible controls and a time-transformation technique, we establish that the infimum of the cost for the network control problem over all admissible sequencing control policies is asymptotically bounded below by the value function of an associated diffusion control problem (the Brownian control problem). This result provides a useful bound on the best achievable performance for any admissible control policy for a wide class of networks.