

Diffusion Approximation for an $N \times N$ Input Queued Crossbar Switch Operating under a Maximum Weight Matching Algorithm

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Input-queued crossbar (IQ) switches are widely used in high speed networks due to their minimal memory bandwidth requirements. It has been shown that the maximum weight matching (MWM) scheduling policy achieves 100% throughput in IQ switches. In this talk, we show that, under a state space collapse result by Shah and Wischik, the heavy traffic diffusion approximation for the workload process of IQ switches under the MWM policy is a semimartingale reflected Brownian motion living in a polyhedral cone. Some partial results on diffusion approximations for the workload under a related family of policies is also discussed. These results use a new invariance principle for reflected diffusions.