Performance Analysis 12: RCAT

Jeremy Bradley

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A tandem queue with feedback has two M/M/1 queueing nodes with a proportion of the output from queue 1 becoming the input to queue 2. The output from queue 2 is either routed with probability \(1 - p\) back to the input of queue 1 or with probability \(p\) exits the network. There is an external input at rate \(\gamma\) into queue 1.

1. Construct a PEPA model of a tandem queue with feedback. Base your model on the tandem queue in the notes and introduce a new action \(f\) to represent feedback from node 2 to node 1. [Note: routing probabilities can be aggregated into the service rate for the different routing actions from node 2.]

2. Use RCAT to construct a product form formula for the steady state distribution of the tandem queueing network with feedback