

A differential equation method with applications to routing models II

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We present some new concentration of measure inequalities for discrete time Markov chains, and illustrate their application by analysing a well-studied routing model in greater depth than had previously been possible. In the model, calls arrive for each pair of endpoints in a fully-connected network as a Poisson process, and calls have exponential durations. Each call is routed either along the link connecting its endpoints, or, if the direct route is unavailable, along a two-link path between them, via an intermediate node.

We use an explicit and simple coupling to show a strong concentration of measure property, and deduce that the evolution of the process may be approximated by a differential equation.

The technique has applications in other settings.

(Partly joint work with Graham Brightwell)