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William A Massey* (wmassey@princeton.edu), ORFE Department, Sherrerd Hall, Princeton University, Princeton, NJ 08544. *Static Profit Optimal Staffing of Dynamic Erlang-A Queues*. Preliminary report.

The Erlang-A queue is a Markovian multi-server queueing model with customer abandonment. It is inspired by telephone resource sharing problems for call center design. Moreover, it has applications to a similar set of resource problems found in healthcare management. The inspiration for our optimization problem comes from a multiple time scale staffing problem involving the management of nursing homes.

We use the theory of strong approximations as we simultaneously scale up the customer demand along with the service resource supply. We then obtain a functional strong law of large numbers result that gives us a limiting deterministic "fluid" limit for the Erlang-A queue. The result is a simple one-dimensional dynamical system that approximates the queueing mean behavior.

Assuming time varying customer demand, we can combine control theory and Lagrangian methods with fixed point equations to create a new algorithm that finds a fixed staffing size for the profit optimality of the Erlang-A fluid model. (Received February 18, 2018)