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Classic performance evaluation using queues is usually done assuming a stable model in equilibrium. However, there are situations where we are interested in the transient phase. In this case, the main metrics are built around the model's state distribution at an arbitrary point in time.

In previous works, we developed an approach to derive this distribution for some Markovian models, built around Jensen's method, transforming the problem into a discrete time one, and duality in stochastic processes, from Anderson's book "Continuous-Time Markov Chains". The latter allows working with absorbing chains, thus providing significant simplifications.

Recently, we discovered that this duality concept is not dependent on the Markovian properties, it is actually more general. We also found that it has a slightly different form when time is discrete. We call now power-dual the latter and exponential-dual the former. They allow a different way of manipulating linear systems of recurrences or of differential equations, even in some cases where systems are infinite.

The talk will describe these concepts and will illustrate them with some examples. (Received August 22, 2018)