

1086-60-810

Barbara Margolius* (b.margolius@csuohio.edu), OH. *In defense of the much maligned Bessel function formula for transition probabilities for the single server queue.*

The single server queue with Poisson arrivals and exponential service is generally considered the simplest interesting queue. The formula for the transient probabilities for the number in queue that is given in many queueing texts involves modified Bessel functions. In their 1962 text, Cox and Smith write:

The solution is, however, far from convenient; when we consider that it originates from one of the very simplest queueing systems, the difficulty of obtaining general solutions in more complicated cases will be apparent.

Reviews of the formula haven't improved much over the years. Over the ensuing decades it has been called: "disheartening", "ugly", "alarming", "somewhat daunting" and "difficult to evaluate or interpret". The most recent of the quotes comes from a 2009 text, while the others span the intervening decades. In this talk, I will discuss how to interpret, evaluate, and generalize this formula beginning with Champnowne's proof involving the random walk. (Received September 13, 2012)