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**Exact tail asymptotics for a discrete-time preemptive priority queue.**


**Summary:** In this paper, we consider a discrete-time preemptive priority queue with different service completion probabilities for two classes of customers, one with high-priority and the other with low-priority. This model corresponds to the classical preemptive priority queueing system with two classes of independent Poisson customers and a single exponential server. Due to the possibility of customers' arriving and departing at the same time in a discrete-time queue, the model considered in this paper is more complicated than the continuous-time model. In this model, we focus on the characterization of the exact tail asymptotics for the joint stationary distribution of the queue length of the two types of customers, for the two boundary distributions and for the two marginal distributions, respectively. By using generating functions and the kernel method, we get the exact tail asymptotic properties along the direction of the low-priority queue, as well as along the direction of the high-priority queue.

**Keywords:** discrete-time queue; stationary distribution; kernel method; exact tail asymptotics
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