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Sojourn time distribution in polling systems with processor-sharing policy

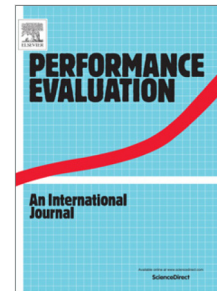
Bara Kim, Jeongsim Kim

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Sojourn time distribution in polling systems with  
processor-sharing policy

Bara Kim\*, Jeongsim Kim\*\*<sup>1</sup>

*\*Department of Mathematics, Korea University*

*145 Anam-ro, Seongbuk-gu, Seoul, 02841, Korea*

*e-mail: bara@korea.ac.kr*

*\*\*Department of Mathematics Education, Chungbuk National University*

*1 Chungdae-ro, Seowon-gu, Cheongju, Chungbuk, 28644, Korea*

*e-mail: jeongsimkim@chungbuk.ac.kr*

**Abstract**

We consider a polling system with a single server and multiple queues where customers arrive at the queues according to independent Poisson processes. The server visits and serves the queues in a cyclic order. The service discipline at all queues is exhaustive service. One queue uses processor-sharing as a scheduling policy, and the customers in that queue have phase-type distributed service requirements. The other queues use any work-conserving policy, and the customers in those queues have generally distributed service requirements. We derive a partial differential equation for the transform of the conditional sojourn time distribution of an arbitrary customer who arrives at the queue with processor-sharing policy, conditioned on the service requirement. We also derive a partial differential equation for the transform of the unconditional sojourn time distribution. From these equations, we obtain the first and second moments of the conditional and unconditional sojourn time distributions.

**Keywords:** Polling system, Exhaustive service, Processor-sharing, Sojourn time distri-

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<sup>1</sup>Corresponding author. Jeongsim Kim, E-mail: jeongsimkim@chungbuk.ac.kr

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