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# Simulation as a Problem-Solving Spotter for System Reliability

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**Abstract :** An important performance measure for stochastic manufacturing networks is the system reliability, defined as the probability that the production output meets or exceeds a specified demand. The system parameters include the capacity of each workstation and numbers of the conforming parts produced in each workstation. We establish that eighteen archival publications, containing twenty-one examples, provide incorrect values of the system reliability. The author recently published the Song Rule, which provides the correct analytical system-reliability value; it is, however, computationally inefficient for large networks. In this paper, we use Monte Carlo simulation (implemented in C and Flexsim) to provide estimates for the above-mentioned twenty-one examples. The simulation estimates are consistent with the analytical solution for small networks but is computationally efficient for large networks. We argue here for three advantages of Monte Carlo simulation: (1) understanding stochastic systems, (2) validating analytical results, and (3) providing estimates even when analytical and numerical approaches are overly expensive in computation. Monte Carlo simulation could have detected the published analysis errors.

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