

BEYOND STRICT INSENSITIVITY

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One of the most notorious historical success (perhaps miracle) of queuing theory is the Erlang formula and its extensions to loss networks. Its applicability relies on its robustness to the call durations distribution: the well known insensitivity property. Attempts to extend this formula to various modern networks (e.g. with best effort traffic) have been only partially successful, due to the increased complexity and intrinsic asymmetries of the corresponding models.

We examine here a relaxed robustness property of stationary queuing systems: the insensitivity of the large deviations characteristics to the distribution of job sizes. We show that this property holds for some fundamental models like bandwidth sharing networks under the proportional fair allocation, giving hope to develop efficient performance evaluation tools. In other cases, generic bounds for the large deviations characteristics of the stationary regime are expected.