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# Network simulator using the RESTART method

Jose Villén-Altamirano\*<sup>1</sup>

<sup>1</sup>Universidad Politécnica de Madrid – Spain

## Abstract

A network simulator using the RESTART method will be presented. First, it will be applied to Jackson networks and then generalize to some non-Jackson networks. Three types of rare events are studied, related with the number of messages in one node, the sum of messages of some nodes and the maximum of the number of messages of several nodes, respectively. For the first case the program calculate the importance function with the formulas derived in [1] for Jackson networks and extended in [2] for non-Jackson networks. New formulas, obtained heuristically, are provided for the second and third type of rare events. The program provides tentative thresholds and number of retrials, which are necessary to make a pilot simulation that obtain the optimal thresholds and number of retrials. Finally, the program estimates the probability of interest with the desired relative error. It can be simulated any type of network with any number of nodes and any topology. Probabilities of the order of E-15 are estimated with short computational times. VILLEN ALTAMIRANO, J. (2010): Importance Functions for RESTART Simulation of General Jackson Networks. *European Journal of Operation Research* 203 (1), 156-165.

VILLEN ALTAMIRANO, J. and M. (2013): Rare event simulation of non-Markovian queueing networks using RESTART method. *Simulation Modelling Practice and Theory* 37, 70-78.

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\*Speaker