Stability of Queueing Networks

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Timetable: 16 hrs. First lecture April 28, 2025, 14:00 (dates already fixed, see Calendar of Activities on https://dottorato.math.unipd.it/calendar), Torre Archimede, Room 2BC30.

Credits: 3

Course requirements: Basic knowledge of continuous-time Markov Chains

Examination and grading: Solving the exercises assigned during the course

SSD: MAT/06

Aim: Queueing networks pervade modern systems, playing a crucial role in diverse fields such as telecommunications, computer networks, manufacturing processes, and service systems. This course aims to foster a profound comprehension of these stochastic models, with a specific emphasis on exploring issues related to stability. Following a formal introduction to queueing networks, the course will delve into the intricacies of stability properties. It will shed light on this concept by presenting examples of unstable networks while also introducing techniques for establishing the stability of stochastic networks through the application of fluid models and Lyapunov functions.

Course contents:

- Introduction to queueing networks
- The classical networks
- Instability of Subcritical Queueing Networks
- Stability of Queueing Networks

Bibliography:

M. Bramson (2008). Stability of queueing networks. Probab. Surv., 5:169-345. DOI:10.1214/08-PS137
M. Bramson, B. D'Auria and N. Walton (2021). Stability and Instability of the MaxWeight Policy. Math. Oper. Res., 46(4): 1611-1638. DOI:10.1287/moor.2020.1106