

Probability Seminar

Organizer: Christian Gromoll & Tai Melcher

Monday, 2:00–3:00pm, Kerchof 326

Mar 19 **Bert Zwart**, Georgia Tech

Bandwidth sharing networks in overload

Processor Sharing (PS) queues were originally introduced to analyze the performance of time-sharing in computer networks. Nowadays, PS queues are one of the most popular congestion models for TCP traffic on the Internet. From a methodological perspective, PS is a challenging service discipline since a measure-valued state descriptor is necessary to analyze the system.

This talk is focused on such systems in overload. We look at a single queue and consider the scenario where customers leave impatient as their waiting time grows too large. We propose a fluid (functional LLN) approximation of this system and investigate the fixed point of this approximation. This leads to several qualitative insights into the dynamics of PS models with impatience. We show that the impact of impatience on the performance of the system can be quite substantial and propose an admission control scheme to reduce its effect.

We will also consider the extension of some of these results to bandwidth sharing networks. The main challenge there is to prove uniqueness of solutions of certain fixed point equations.