Abstract: "Overview on results and open problems related to heavy-tailed distributions"

I will speak about various topics related to heavy tails, formulate some results and hypotheses, and introduce a number of open problems.

I will start with asymptotic analysis of tail probabilities for the supremum $M = \sup_n S_n$ of a random walk $S_0 = 0, S_n = X_1 + ... + X_n$ given M is finite a.s., and review the five main cases, two cases for heavy-tailed distributions and three cases for light-tailed distributions. Then I formulate open questions related to the "intermediate" light-tailed case. This relates to the papers [DFK] and [FP].

Second, I will consider sums and maxima of dependent random variables in the presence of heavy tails, discuss general assumptions related to "conditional independence" and provide examples. This part is based on the paper [FR].

Third, I will talk about the distributional asymptotics for time and value of an overshoot over a high level, for a modulated random walk with heavy-tailed distributions. This relates to the paper [AF] and to the book [FKZ] (second edition).

If time allows, I'll also talk about a number of open problems on the tail asymptotics for a number of characteristics of multi-dimensional stochastic queues and networks. This part relates to the papers [BF], [FK1], [FK2] and [FM].

References:

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[AF] S. Asmussen and S. Foss. "On exceedance times for some processes with dependent increments". (J. Appl. Probab., 2014 -to appear).

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