

Department of Mathematical Sciences
The Johns Hopkins University

SEMINAR

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November 7, 2002
304 Whitehead Hall
Refreshments: 3:30 p.m.
Seminar: 4:00 p.m.

HEAVY TAILS AND COMPUTER NETWORKS

ABSTRACT

Ethernet local area network traffic appears to be approximately statistically self-similar. This discovery, made about twelve years ago, has had a profound impact on the field. I will try to explain what statistical self-similarity means and indicate how one can construct random processes with that property by aggregating a large number of “on–off” renewal processes. If the number of replications grows to infinity then, after rescaling, the limit turns out to be the Gaussian self-similar process called fractional Brownian motion. If, however, the rewards are heavy-tailed as well, then the limit is a stable non-Gaussian process with infinite variance and dependent increments. Since linear fractional stable motion is the stable counterpart of the Gaussian fractional Brownian motion, a natural conjecture is that the limit process is linear fractional stable motion. This conjecture, it turns out, is false. The limit is a new type of infinite-variance self-similar process.