THE SELF-SIMILAR AND MULTIFRACTAL NATURE
OF A NETWORK TRAFFIC MODEL

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Abstract. We look at a family of models for Internet traffic with increasing input rates and consider approximation models which exhibit self-similarity at large time scales and multifractality at small time scales. Depending on whether the input rate is fast or slow, the total cumulative input traffic can be approximated by a self-similar stable Lévy motion or a self-similar Gaussian process. The stable Lévy limit does not depend on the behavior of the individual transmission schedules but the Gaussian limit does. Also, the models and their approximations show multifractal behavior at small time scales.

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