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Reduced long-range dependence combining Poisson bursts with on--off sources

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A workload model using the infinite source Poisson model for bursts is combined with the on--off model for within burst activity. Burst durations and on--off durations are assumed to have heavy-tailed distributions with infinite variance and finite mean. Since the number of bursts is random, one can consider limiting results based on "random centering" of a random sum for the total workload from all sources. Convergence results are shown to depend on the tail indices of both the on--off durations and the lifetimes distributions. Moreover, the results can be separated into cases depending on those tail indices. In one case where all distributions are heavy tailed it is shown that the limiting result is Brownian motion. In another case, convergence to fractional Brownian motion is shown, where the Hurst parameter depends on the heavy-tail indices of the distribution of the on, off and burst durations.

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