

EXTREMES OF CHI-SQUARE PROCESSES WITH TREND

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Abstract: This paper studies the supremum of chi-square processes with trend over a threshold-dependent-time horizon. Under the assumptions that the chi-square process is generated from a centered self-similar Gaussian process and the trend function is modeled by a polynomial function, we obtain the exact tail asymptotics of the supremum of the chi-square process with trend. These results are of interest in applications in engineering, insurance, queueing and statistics, etc. Some possible extensions of our results are also discussed.

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Keywords and phrases: Chi-square process, Gaussian random field, safety region, tail asymptotics, first passage time, Pickands constant, Piterbarg constant, Fernique-type inequality.

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