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Generalization of the BKS Theorem and Noise Sensitivity in First-Passage Percolation

Malo Hillairet*

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Abstract

Ahlberg and de la Riva recently proved noise sensitivity of the indicator of a travel time being above its median as the first evidence of noise sensitive behavior in first-passage percolation. We extend the BKS theorem from indicator functions from the hypercube to real-valued functions from the hypercube, making use of the hypercontractive inequality in a Markovian framework instead of a Fourier analysis framework. This allows us to deduce noise sensitivity of the first-passage percolation left-right travel time in the square with restricted vertical fluctuations in the case of a binary weight distribution, following the work of Ahlberg and de la Riva.

*Postal address: Mathematical Statistics, Stockholm University, SE-106 91, Sweden. E-mail: malo.hillairet@ens-lyon.fr. Supervisor: Daniel ahlberg.