GAUSSIAN UPPER BOUNDS FOR HEAT KERNELS OF CONTINUOUS TIME SIMPLE RANDOM WALKS

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We consider continuous time simple random walks with arbitrary speed measure θ on infinite weighted graphs. Write $p_t(x,y)$ for the heat kernel of this process. Given on-diagonal upper bounds for the heat kernel at two points x_1, x_2, we obtain a Gaussian upper bound for $p_t(x_1,x_2)$. The distance function which appears in this estimate is not in general the graph metric, but a new metric which is adapted to the random walk. Long-range non-Gaussian bounds in this new metric are also established. Applications to heat kernel bounds for various models of random walks in random environments are discussed.