

# A Hitting Time Formula for the Discrete Green's Function

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## Abstract

The discrete Green's function (without boundary)  $\mathbb{G}$  is a pseudo-inverse of the combinatorial Laplace operator of a graph. We discuss the intimate connection between Green's function and the theory of exact stopping rules for random walks on graphs. The most important characteristics of a stopping rule are its exit frequencies, which are the expected number of exits of a given vertex before the rule halts the walk. We show that Green's function is, in fact, a matrix of exit frequencies plus a rank one matrix. This leads to an elementary formula for Green's function in terms of state-to-state hitting times.