Broken link style decoherence
Continuous fire model

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Mixing Times in Quantum Walks on Hypercube

\[ \hat{x} = (x_1, x_2, \ldots, x_n) \]
\[ e_j = (0, 0, \ldots, 0, 1, 0, \ldots, 0) \]

\[ \xi_j \]

\[ S = |x\rangle \otimes |j\rangle = |x + e_j\rangle \otimes |j\rangle \]

Define \( \xi_j(x) = \{ \begin{array}{ll}
1 & \text{if link at } x \text{ in direction } j \text{ is closed} \\
0 & \text{if link is open}
\end{array} \)

NB: \( \xi_j'(x + e_j) = \xi_j(x) \)

\[ \text{open/closed iid probability } p \]

\[ S' = |x\rangle \otimes |j\rangle = |x + e_j'(x)\rangle \otimes |j\rangle \]

random unitary transformation

Evolution at time \( t \) is \( U_k = S'(I \otimes U) \)

now depends on \( t, x, \ldots \) etc

\[ \psi_t = U_k U_{k-1} \ldots U_2 U_1 \psi_0 \]

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