min cut

\( (5,15) \)

\( n \leq \lambda m \)

Max cut

NP-hard
If $uv$ is not in the min cut of $G$ then

$$\text{mincut}(G/uv) = \text{mincut}(G)$$
\[ P = \frac{k}{\ln(a/2e^a)} = \frac{2}{100} = 0.02. \]
\[ T(n) = O(n^2) + 2T\left(\frac{n}{2}\right) = O(n^2 \log n) \]
To a full binary tree of height $h$, color edges of $T_h$ with blue and red edges.

Q: What is the probability to a blue path from the root to an leaf of $T_h$?

$h = O(\log n)$

Claim: Any path in $T_h$ with prob $\geq \frac{1}{h+1}$.

$O(\log^2 n)$ times

$O(n^2 \log^3 n)$
Galton–Watson process

Depending on $E[X]$, the process can be:
- $E[X] > 1, \quad \text{growth, } \lambda > 0$
- $E[X] = 1, \quad \text{critical, } \lambda = 0$
- $E[X] < 1, \quad \text{extinction, } \lambda < 0$

\[ X_n = \sum_{i=1}^{X_{n-1}} Y_i, \quad Y_i \sim \text{Bernoulli}(p) \]