Probabilistic Methods in Combinatorics

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Hints for assignment 13

Problem 1. Use induction.

Problem 2. For every edge uv, define A_{uv} to be the event that at most one of u and v is in S.

Problem 3. First show that we may replace each $\mathcal{F}_i$ with its up-closure $\mathcal{H}_i$ in $2^{[n]}$, i.e.

$$\mathcal{H}_i = \{A \subseteq [n] : \exists B \in \mathcal{F}_i \text{ s.t. } B \subseteq A\}.$$

Problem 4. First show that for a given vertex v, the probability that v has degree at most $k - 1$ is $1/2$.