Alon-Chung lemma

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Let $G = (V, E)$ be a undirected graph of n vertices such that the degree of each vertex is equal to d. Let X be a subset of V. Then the number of edges in the subgraph induced by X is at most

$$\frac{1}{2n}\left(d|X|^2 + \lambda|X|(n - |X|)\right)$$

where λ is the second largest eigenvalue of the adjacency matrix of G.

Reference: N. Alon and F. R. K. Chung, "Explicit construction of linear sized tolerant networks," Discrete Math., vol. 72, pp. 15-19, 1988.