Influences and sharp thresholds

(3 hours)

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I will discuss the notion of the influence of a variable on a Boolean function. Then sketch the proof of the Friedgut's theorem which says that if $f : \{0,1\}^n \to \{0,1\}$ has small total influence then it essentially depends on few coordinates. This theorem does not hold when the uniform distribution on $\{0,1\}^n$ is replaced with the p-biased distribution for a small value of p. I will discuss the relevance of this case to the study of the threshold phenomenon, and then sketch the proof of a theorem of myself which characterizes the structure of Boolean functions with small total influences on general product probability spaces.

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