

## **Bounds for essential covers of the cube**

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An essential cover of the vertices of the  $n$ -cube  $\{-1, 1\}^n$  by hyperplanes is a minimal covering where no hyperplane is redundant and every variable appears in the equation of at least one hyperplane. Linial and Radhakrishnan gave a construction of an essential cover with  $n/2 + 1$  hyperplanes and showed that  $\sqrt{n}$  hyperplanes are required. Recently, Yehuda and Yehudayoff improved the lower bound by showing that any essential cover of the  $n$ -cube contains at least  $n^{0.52}$  hyperplanes. In this talk, we show that  $n^{5/9}$  hyperplanes are needed. This is based on a joint work with Araujo and Balogh.