1171-05-244 Alexander J. Clifton* (aclift2@emory.edu). Almost $k$-coverings of grids.
Alon and Füredi determined the minimum number of affine hyperplanes needed to cover all but one point of an $n$ dimensional rectangular grid. We extend this question to the case where all grid points must be covered at least $k$ times, except for one which is not covered at all. Using the Punctured Combinatorial Nullstellensatz of Ball and Serra, we solve this question for $k=2$. In the special case where the grid is a hypercube, we solve the problem completely for $k=3$ and establish a nontrivial lower bound when $k>3$.

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