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Hierarchical models: normality and related properties.

Associated to a simplicial complex \mathcal{C} with ground set $\{1, 2, \dots, m\}$ and an integer vector $\mathbf{d} \in \mathbb{N}^m$ is the design matrix $\mathcal{A}_{\mathcal{C}, \mathbf{d}}$ for a hierarchical model. We are interested in developing techniques for determining when $\mathcal{A}_{\mathcal{C}, \mathbf{d}}$ satisfies various “niceness” properties. The case where $\mathbf{d} = \mathbf{2}$, the vector of all 2s, is of particular interest. New results include a complete classification of the simplicial complexes that give rise to unimodular $\mathcal{A}_{\mathcal{C}, \mathbf{2}}$, and progress towards the classification problem for compressed and normal $\mathcal{A}_{\mathcal{C}, \mathbf{2}}$. (Received August 05, 2015)