عنوان مقاله:

Majorization and the number of bipartite graphs for given vertex degrees

محل انتشار:

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خلاصه مقاله:

The \emph{bipartite realisation problem} asks for a pair of non-negative, non-increasing integer lists a:=(a_1,\ldots,a_n) and b:=(b_1,\ldots,b_{n'}) if there is a labeled bipartite graph G(U,V,E) (no loops or multiple edges) such that each vertex u_i \in U has degree a_i and each vertex v_i \in V degree b_i. The Gale-Ryser theorem provides characterisations for the existence of a `realisation' G(U,V,E) that are strongly related to the concept of \emph{majorisation}. We prove a generalisation; list pair (a,b) has more realisations than (a',b), if a' majorises a. Furthermore, we give explicitly list pairs which possess the largest number of realisations under all (a,b) with fixed n, n' and m:=\sum_{i=1}^n a_i. We introduce the notion~\emph{minconvex list pairs} for them. If n and n' divide m, minconvex list pairs turn in the special case of two constant lists a=(\frac{m}{n},\ldots,\frac{m}{n}) and b=(\frac{m}{n'},\ldots,\frac{m}{n'}).

کلمات کلیدی:

bigraphic sequence, matrices with fixed row and column sums, contingency tables with fixed margins, bipartite realisation problem, Gale-Ryser theorem