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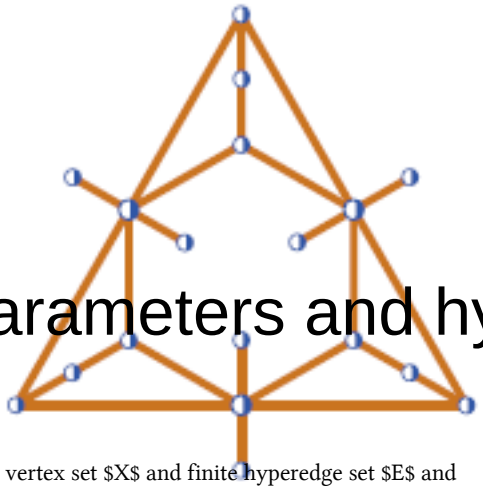

Domatic parameters and hypergraphs

Content :

Let H be a hypergraph with finite vertex set X and finite hyperedge set E and $Y\subset\mathbb{R}$ a subset of the real numbers.
A Y-valued function $f\colon X\to Y$ with the property that for any hyperedge $e\in E$, the condition $f(e)=\sum_{x\in e} f(x)\ge 1$ is fulfilled is called a \emph{Y-transversal function} of H.
The set Y is called \emph{weight set} and the \emph{weight} of a Y-transversal function~f is the value $\omega(f)=\sum_{x\in X} f(x)$.
A family $\{f_1,f_2,\ldots,f_d\}$ of distinct Y-transversal functions of H with the property that $\sum_{i=1}^d f_i(x)\le 1$ for each $x\in X$, is called a \emph{Y-partition} on~H.
The maximum number of functions in such a family is the \emph{Y-partition number} of H, denoted by $d_{Y}(H)$.

We present basic properties and bounds for the Y-partition number of a hypergraph. In addition, we determine the Y-partition number of some classes of hypergraphs. Various domination parameters of graphs as well as the related domatic parameters may be described in terms of Y-transversal functions by choosing an appropriate weight set~Y and associated hypergraph~H (for example the neighborhood hypergraph of G).
Hence, some of our results are generalizations of well-known properties of various domatic parameters of graphs and directed graphs.

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