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*CHARACTERIZATION OF DIRECTED P-GRAPHS***

Abstract: In this paper we introduce directed P -graphs and P_k -graphs, as extensions of their previously studied undirected counterparts. The main result of this research computes the minimum number of edges of directed P -graphs and describes the structure of such minimal graphs. We establish a connection between this minimal structure and integer partitions, which allows us to exactly compute the number of distinct, non-isomorphic minimal directed P -graphs. We also characterize the density of the more general directed P_k -graphs relative to the entire set of graphs.

Keywords: graph structure, minimal problems, density estimation