

Decompositions of Complete Digraphs into Small Tripartite Digraphs

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The paw graph consists of a triangle with a pendant edge attached to one of the three vertices. We obtain a multigraph by adding exactly one repeated edge to the paw. Now, let D be a directed graph obtained by orientating the edges of that multigraph. For 12 of the 18 possibilities for D , we establish necessary and sufficient conditions on n for the existence of a (K_n^*, D) -design. Partial results are given for the remaining 6 possibilities for D . This research is supported by grant number A1359300 from the Division of Mathematical Sciences at the National Science Foundation.