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Section:

17. Control Theory and Optimization

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Research of 4-cliques Problem

A solution of problem is such sceleton subgraph $x = (V, E_x)$ of the given graph $G = (V, E)$ in which every connected component is 4-vertex complete graph, $\mid V \mid = n = 4k, k = 1, 2, ..., X = \{x\}$, is a set of admisible solutions (SAS); $\Re = (n, R, N) = G$, is set of all n-vertexes graph G, in which edges $e \in E$ are weighted by weights $\omega_\nu(e) \in \{1, 2, ..., R\}, \nu = \overline{1, N}$. The vector objective function (VOF) $F(x) = \{F_1(x), F_2(x), ..., F_N(x)\}, F_\nu(x) = \sum\limits_{e \in E_x} \rightarrow min, \nu = \overline{1, N}$ determines Pareto set $\mathrm{X} \subseteq X$. Required solution of vector problem is complete set of alternative (CSA) X^0, where the subset has minimal cardinality satisfies to equality $F(x^0) = F(\mathrm{x}) = \{F(\mathrm{x}) : \mathrm{x} \in \mathrm{X}\}$. If $N \geq 2$ then this problem is hart solvable. Author proposes the polynomial algorithm α. If $R^{2N} \leq n/2(\ln n + \ln \ln n)$ then algorithm α finds CSA for almost all graphs $G \in \Re(n, R, N)$.