Multi-core Graphs: Characterization and Properties

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The *core-satellite graphs* were defined by Estrada and Benzi (2017). Informally, they are the graphs consisting of η copies of K_s (the satellites) meeting in a K_c (the core) and they encompass some well-known subclasses of chordal graphs (e.g. the *windmill graphs*, the *split-complete graphs* and the *star graphs*). The *generalized core-satellite* (*gen core-satellite*) graphs were also defined in the same paper: graphs consisting of a core clique with c vertices and $\eta = \eta_1 + \ldots + \eta_t$ satellite cliques where η_i cliques have s_i vertices, being $s_i \neq s_j$ for $i \neq j$, with $s_i \geq 1$ and $\eta_i \geq 1$ for all $i = 1, \ldots, t$.
We introduce the *multi-core graphs*, which extend the definition of gen core-satellite graphs. Let $G_1, G_2, \ldots, G_k$ be gen core-satellite graphs; the graph obtained by the join of the cores and the union of the satellites of $G_i, 1 \leq i \leq k$, is a *multi-core graph*. Informally, they are the graphs consisting of a subset of satellites meeting at a subset of the core clique. We characterize the *multi-core graphs*, showing that they constitute the class of the (P_5, gem, dart)-free chordal graphs. A linear time recognition algorithm is presented. We also study their relation with other chordal graphs as the *clique corona graphs* and the *starlike graphs*.

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