Consider a graph $\mathscr{D}_n$ whose vertex set is $\mathscr{S}_n$ and in which two vertices $\mathfrak{G}_1 \in \mathscr{S}_n$, $\mathfrak{G}_2 \in \mathscr{S}_n$ are adjacent if and only if $\delta(\mathfrak{G}_1, \mathfrak{G}_2) = 1$. It is easy to prove that the distance of vertices in $\mathscr{D}_n$ is δ. The diameter of $\mathscr{D}_n$ is $n - 1$; this is the distance between the isomorphism class consisting of complete graphs and the isomorphism class consisting of graphs without edges. The distance between any other pair of vertices is less than $n - 1$, because if a graph G_1 has edges and is not complete, it contains both kinds of two-vertex subgraphs and thus there exists its two-vertex subgraph which is isomorphic to a subgraph of an arbitrary other graph G_2. (All considered graphs have n vertices.) According to Theorem 1 then there exists a graph with at most $2n - 2$ vertices containing induced subgraphs isomorphic to G_1 and G_2.

We have restricted our consideration to undirected graphs without loops and multiple edges. Nevertheless, Theorem 1 and Theorem 2 remain valid even if we consider undirected graphs with loops and multiple edges or directed graphs. In Theorem 3 we must consider graphs without loops and multiple edges; otherwise we could not speak about complements. If instead of $\mathscr{S}_n$ we consider the set of all isomorphism classes of graphs which may contain loops, then for the diameter of the corresponding graph we obtain the value n instead of $n - 1$; this is the distance between the isomorphism class consisting of some graphs with n vertices without loops and the isomorphism class consisting of some graphs with n vertices with a loop at each vertex.

The investigation of $\mathscr{D}_n$ seems to be very difficult, because for greater values of n it is difficult even to determine its vertex set. According to Theorem 3 we can assert that there exists an automorphism of $\mathscr{D}_n$ which maps each isomorphism class $\mathfrak{G}$ onto the isomorphism class $\overline{\mathfrak{G}}$ consisting of the complements of graphs from $\mathfrak{G}$. It would be interesting to find the radius of $\mathscr{D}_n$.

Reference

[1] *В. Г. Визинг:* Некоторые нерещенные задачи в теории графов. Успехи мат. наук *23* (1968), 117—134.

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