Interval k-Orders

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Suppose $\mathcal{I}$ is a family of intervals. If the vertices of graph H correspond to the intervals of $\mathcal{I}$ and are adjacent if and only if their corresponding intervals intersect, then H is an *interval graph*. Now suppose $\mathcal{I}$ is partitioned into k classes. Let G be the graph with vertices corresponding to the intervals of $\mathcal{I}$ and adjacent if and only if their corresponding intervals intersect and belong to different classes; then G is an *interval k-graph*. Unlike the interval graph H, G is not necessarily the incomparability graph of an ordered set. We characterize the interval k-graphs that are the incomparability graphs of ordered sets and give a characterization of what we call *interval k-orders*. We also investigate the jump number and linear discrepancy of interval k-orders.

Keywords: interval graph, ordered set, linear discrepancy, ordered set, jump number.