The $(n,k)$-Bubble Sort Graphs

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One of the most popular interconnection networks is the star graph, $S_n$. It was introduced as a competitive model to the hypercube. However one common complaint is the restriction on the number of vertices, $n!$ vertices for $S_n$. So one may face the choice of either too few or too many available vertices. There are good graph topologies that generalize the star graphs and address this issue such as the $(n,k)$-star graph and the arrangement graph. The star graph is a member of a class of interconnection networks that are generated by transpositions. Another famous member of this class of graphs is the bubble-sort graph $B_n$. Like the star graphs, the bubble sort graphs suffer the same shortcoming regarding the gaps on the number of vertices in the available graphs. In this paper, we introduce the $(n,k)$-bubble sort graphs to address this issue for $B_n$.

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