Surface Areas of Select Interconnection Networks

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For graph G, the surface area centered at vertex $v \in V(G)$ is the number of vertices at distance i from v, for $0 \leq i \leq D(G)$, where $D(G)$ is the diameter of graph G. This property is well defined for symmetric (arc transitive) graphs, which see use in parallel computation and networking. The surface area of symmetric networks can be used to compute bounds on the performance of certain forms of information dissemination such as broadcasting, routing and shouting. For a given network, the surface area can be in the form of a recurrence, an explicit formula or a closed-form formula. We present definitions and results regarding the networks that we seek to find a solution for the surface area. We then show new solutions for the surface area in the form of explicit formulas for the Bicube and Cross Cube as well as a recurrence for the Crossed Cube. Finally, we show how one can derive a closed-form formula from the recurrence presented for the Crossed Cube.

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