Given a graph $G$, a well-known problem is to find the number of the shortest paths between a pair of vertices in $G$. A solution to this counting problem can serve as an important topological property for an interconnection network in terms of strong connectivity, effective fault-tolerance, lower communication cost and desired routing flexibility.

It turns out that the number of the shortest paths between $v$ and $e_k$ in an $(n,k)$-star graph equals the number of minimum factorizations of $v$ in terms of $(n,k)$-star transpositions, which we enumerate in this talk. (Received February 26, 2010)