

## Degree Sum and Vertex Dominating Paths

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A *vertex dominating path* in a graph is a path  $P$  such that every vertex outside  $P$  has a neighbor on  $P$ . In 1988 H. Broersma stated a result implying that every  $n$ -vertex  $k$ -connected graph  $G$  such that  $\sigma_{(k+2)}(G) \geq n - 2k - 1$  contains a dominating path. We show that every  $n$ -vertex  $k$ -connected graph with  $\sigma_2(G) \geq \frac{2n}{k+2} + f(k)$  contains a dominating path of length at most  $O(|T|)$ , where  $T$  is a minimum dominating set of vertices. The main result is that every  $n$ -vertex  $k$ -connected graph such that  $\sigma_2(G) \geq \frac{2n}{k+2} + f(k)$  contains a path of length at most  $O(|T|)$  through any set of  $T$  vertices where  $|T| = o(n)$ .

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