1077-05-1637 **Ralucca Gera*** (rgera@nps.edu), 1 University Way, Montrey, CA 93955, and **Linda Eroh** and **Steven Winters**. *Closed 3-stop distance in graphs.*

A delivery person must leave the central location of the business, deliver packages at a number of addresses, and then return. Naturally, he/she wishes to reduce costs by finding the most efficient route. This motivates the following: Given a set of k distinct vertices $\mathcal{S} = \{x_1, x_2, \ldots, x_k\}$ in a simple graph G, the closed k-stop-distance of set $\mathcal{S}$ is defined to be

$$d_k(\mathcal{S}) = \min_{\theta \in \mathcal{P}(\mathcal{S})} \Big(d(\theta(x_1), \theta(x_2)) + d(\theta(x_2), \theta(x_3)) + \ldots + d(\theta(x_k), \theta(x_1)) \Big),$$

where $\mathcal{P}(\mathcal{S})$ is the set of all permutations of $\mathcal{S}$. The closed 2-stop distance is twice the standard distance between two vertices. We study the closed k-stop center and closed k-stop periphery of a graph, for $k = 3$. (Received September 20, 2011)