1079-05-112 **Paul Feit*** (feit_p@utpb.edu), Department of Mathematics, 4901 East University Blvd., Odessa, TX 79762. *Canonical Graphs for Resolving Lists with Specified Distances.*

We define a *baseline matrix* to be a symmetric matrix with certain properties.

A *metric selection* is a triple $(r, \Gamma; w_1, \cdots w_r)$ in which Γ is a finite connected graph and $w_1, \cdots w_r$ is a list of vertices. Let ρ be the shortest path metric of Γ. We say that $w_1, \cdots w_r$ *resolves* Γ if the *code map* on vertices $x \in V(\Gamma)$

$$x \mapsto (\rho(w_1, x), \cdots, \rho(w_r, x))$$

is injective. Also, the $r \times r$ matrix $[\rho(w_i, w_j)]$ is a baseline matrix; refer to it as the *baseline of the selection.*

For a fixed baseline matrix B and an integer d greater than all of B's entries, we find a metric selection $(r, Gr(B, d); e_1, \cdots, e_r)$ which (1) is resolved, (2) has diameter d, and (3) has a universal property: If $(r, \Gamma, w_1, \cdots, w_r)$ is a metric selection whose baseline equals B, and whose diameter is $\leq d$, then there is a unique graph injection $f : \Gamma \longrightarrow \Lambda$ which commutes with the code maps of the respective selections.

This family of "canonical graphs" includes those used by [**Hernando et al**] in proving sharp bounds on the number of vertices of a metric dimension r graph of diameter d. (Received January 02, 2012)