Meeting: 1002, Pittsburgh, Pennsylvania, SS 15A, Special Session on PDE-Based Methods in Imaging and Vision

1002-49-134 **David Groisser*** (groisser@math.ufl.edu), Department of Mathematics, University of Florida, PO Box 118105, Gainesville, FL 32611-8105. *Existence and Local Uniqueness of Certain Optimal Correspondences between Plane Curves.*

Tagare in 1997 introduced *bimorphisms*—a certain type of non-rigid correspondence between simple, closed, regular plane curves C_1, C_2 of differentiability class C^j, $2 \leq j \leq \infty$—and a type of objective functional that treats C_1, C_2 symmetrically. A *best non-rigid match* between C_1 and C_2 is a minimizer of such a functional. In this talk we express these functionals in terms of a "grand objective functional" on a space $\mathcal{M}_j^{\rm int} \times \tilde{\mathcal{S}}_j \times \tilde{\mathcal{S}}_j$, where $\mathcal{M}_j^{\rm int}$ is a universal, infinite-dimensional space of "C^j internal homotopy-bimorphisms" that is independent of C_1 and C_2, and $\tilde{\mathcal{S}}_j$ is the shape-space of simple, closed, regular, C^j plane curves. We will see that for no finite j is $\mathcal{M}_j^{\rm int}$ a differentiable manifold, but that $\mathcal{M}_\infty^{\rm int} \times \tilde{\mathcal{S}}_\infty \times \tilde{\mathcal{S}}_\infty$ is a tame Fréchet manifold. We are then able to use the Nash Inverse Function Theorem to show that if C_1 and C_2 are C^∞ curves whose shapes are not too dissimilar, and neither is a perfect circle, then the minimum of a regularized objective functional exists and is locally unique. (Received September 11, 2004)