

Modeling Plane Strain (MPS), An Interactive C# Program

By: Brandi Denton

Advisor: Gary Girty

Abstract

MPS, a program written in the Visual C# language, is an interactive educational tool for the undergraduate level college student and non-professional interested in the concepts of strain. MPS allows a student to visualize distortions of an initially circular object as it is transformed into a strain ellipse. Pure and simple shear of 72 coordinate points of an initial circle are tracked with displacement path vectors. Lines of no finite longitudinal strain also can be monitored during both progressive pure and simple shear. Key strain parameters are accessed through various dialog boxes. As strain increments are applied, the results of coordinate transformations are added to a color-coordinated data grid. Complex strain paths involving any combinations of pure, simple, or general strain can be modeled. MPS can be downloaded at: <http://www.rohan.sdsu.edu/~vss>. A detailed tutorial on how to use MPS is provided, and the complete C# code used in the generation of MPS is provided as an appendix.