

**Meeting:** 1004, Bowling Green, Kentucky, SS 4A, Special Session on Knot Theory and Its Applications

1004-92-186      **Isabel K. Darcy\*** (idarcy@math.uiowa.edu), Department of Mathematics, MLH 14, University of Iowa, Iowa City, IA 52242, and **Stephen D. Levene** and **Robert G. Scharein**. *Solving tangle equations with KnotPlot*.

A tangle is a 3-dimensional ball containing a finite number of arcs and circles properly embedded in the 3-dimensional ball. A protein can be modeled using a 3-dimensional ball. If the protein binds to two segments of DNA, the two DNA segments can be thought of as two arcs embedded in the 3-dimensional ball. Proteins, such as recombinases and topoisomerase, when acting on circular DNA will produce knotted and linked DNA. By solving tangle equations which model these reactions, much information regarding the protein's mechanism may be gained.

KnotPlot, developed by Rob Scharein, is an interactive 3D program for visualizing and manipulating knots. A subroutine for solving tangle equations within KnotPlot will be demonstrated. The output consists of both 3D images of the solutions as well as a mathematical output stating when all solutions have been found including proofs. (Received January 24, 2005)