1002-92-192 **Dorothy Buck*** (`dbuck@math.ucdavis.edu`), Department of Mathematics, University of California at Davis, (and Imperial College, London, England), Davis, CA 95616, and **Cynthia Verjovsky Marcotte**. *Classification of Tangle Solutions for Integrases.*

The action of proteins in the Integrase family on circular, double-stranded DNA often changes the topology of the underlying DNA, e.g. transforming an unknotted substrate to a range of different torus knots and links. We consider two systems of tangle equations that arise when modeling this transformation. These two systems—direct and inverted repeats—correspond to two different possibilities for the initial DNA sequence.

Using no (biologically reasonable but mathematically simplifying) assumptions, we utilize Dehn surgery arguments to completely classify the tangle solutions for each of the two systems. Surprisingly, a mechanism for the inverted system arises that has no corresponding direct solution. We discuss the possible biological implications of this classification, and of this novel solution. (Received September 14, 2004)