1020-62-256 **Michael L Szafron*** (szafron@sasktel.net), 129 Avenue E South, Saskatoon, SK S7M1R7, Canada, and **Christine E Soteros** (soteros@math.usask.ca), 106 Wiggins Road, McLean Hall, Saskatoon, SK S7N5E6, Canada. *The Probability of Knotting after a Local Strand Passage in a SAP.*

Due to DNA's structure, it is prone to several different topological entanglement problems. The cell must be able to resolve these problems because the problems interfere with vital cell functions. For instance, knotted DNA cannot replicate successfully. The cell therefore must have some mechanism by which the DNA can be unknotted. This mechanism is the interaction of the DNA with the topoisomerase enzymes.

The topoisomerase enzymes interact locally with the DNA and pass one strand of DNA through itself via an enzyme-bridged transient break in the DNA (Roca and Wang 1994). Since these local strand-passages can change the knot-type of the DNA (Dean et al. 1985, Wasserman and Cozzarelli 1991), experimentalists can use the frequency of knots produced to characterize topoisomerase action on DNA topology (Wasserman and Cozzarelli 1986).

It is of interest whether these local strand-passages are implemented at random locations in the DNA. In order to investigate this problem, simplified models of ring polymers of knot-type K were implemented via Monte Carlo simulation to estimate the probability that a ring polymer has knot-type K' after a local strand passage has occurred within the ring polymer. The model and some estimates of the knotting probabilities will be presented. (Received August 29, 2006)