

Pacific Institute for the Mathematical Sciences

Distinguished Public Lectures in Mathematical Biology

Wednesday, April 23rd 2014 University of Saskatchewan

Biology Building Room106 4:00 PM

DNA unlinking in bacterial cells

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Abstract:

Chromosomes are long, rod-shaped, DNA molecules encoding the genetic code of an organism. The genome of bacterium *Escherichia coli* (E. Coli) is encoded in one single circular chromosome. Multiple cellular processes such as DNA replication and recombi-



nation change the topology of circular DNA. In particular, newly replicated circular chromosomes are topologically linked. Controlling these topological changes, and returning the chromosomes to an unlinked monomeric state is essential to cell survival. The cell uses enzymes to simplify the topology of DNA. We use mathematical techniques from knot theory, aided by computational tools, to study the action of these enzymes.



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