1067-54-264 **Christian Laing*** (cl84@biomath.nyu.edu), Courant Institute of Mathematical Sciences, Department of Chemistry, New York University, and **De Witt Sumners**, Department of Mathematics, Florida State University. *The writhe additivity formula and its applications to biomolecules.*

The writhe of a simple closed curve in 3-space is the signed average number of crossings seen when averaged over all directions in space. This important measure of entanglement has been widely used to model geometric and topological properties of biomolecules, and predict the functional biological outcomes form their structural configurations. The writhe of a polygonal curve can be computed as the sum of writhe increments coming from any two oriented edge segments composing the polygonal curve. By using this approach, the writhe can be extended to edge-oriented finite spatial graphs, spatial polygonal arcs and non-connected graphs. This generalization does not require the ad hoc closing of arcs to eliminate the problems posed by endpoints. I will discuss a new formula for the additivity of writhe for structures constrained to separate topological domains, and present some of these applications of the writhe to study properties of biomolecules such as DNA, RNA and proteins. (Received August 14, 2010)