Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

A curvature-based description for the kinematics of *C. Elegans*[1]

VENKAT PADMANABHAN, ZEINA KHAN, DEEPAK SOLOMON, SIVA VANAPALLI, Texas Tech University, KENDRA RUMBAUGH, Texas Tech University Health Sciences Center, JERZY BLAWZDZIEWICZ, Texas Tech University —

Caenorhabditis Elegans is a free-living soil nematode that propels itself in various complex environments by producing undulatory body motion. Such nematodes display a rich variety of body shapes and trajectories during their locomotion. Here we show that the complex shapes and trajectories of *C. Elegans* have a simple analytical description in curvature representation. Our model is based on the assumption that the curvature wave is generated in the head segment of the worm body and propagates backwards. We have found that a simple sinusoidal function for the curvature can capture multiple worm shapes during the undulatory movement. The worm body trajectories can be well represented by piece-wise sinusoidal curvature with abrupt changes in amplitude, frequency, and phase.

[1]We acknowledge financial support by NSF grant CBET 1059745.

Venkat Padmanabhan
Texas Tech University

Date submitted: 11 Nov 2011 Electronic form version 1.4