

Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Nematode Chemotaxis: Gradual Turns, Sharp Turns, and Modulated Turn Angles¹ AMAR PATEL, Texas Tech University, VENKAT PADMANABHAN, Indian Institutes of Technology Kharagpur, KENDRA RUMBAUGH, Texas Tech University Health Sciences Center, SIVA VANAPALLI, JERZY BLAWZDZIEWICZ, Texas Tech University — We examine strategies used by the soil-dwelling nematode *Caenorhabditis Elegans* for chemotaxis in complex environments. The proposed description is based on our recently developed piecewise-harmonic-curvature model of nematode locomotion [PLoS ONE, 7(7) e40121 (2012)], where random harmonic-curvature modes represent elementary locomotory movements. We show that the previously described gradual-turn and sharp-turn chemotaxis strategies can be unified in our model. The gradual-turn mechanism relies on crawling amplitude changes commensurate with the undulation frequency. The sharp-turn mechanism consists in modulation of the frequency of jumps to large-amplitude modes. We hypothesize that there exists a third strategy, where the nematode adjusts the variance of the amplitude distribution. Such adjustments result in a modulation of the magnitude of random turns, with smaller turns performed when the nematode moves toward the increasing chemoattractant concentration. Experiments are proposed to determine if the third strategy is present in the nematode behavior.

¹This work was supported by NSF grant No. CBET 1059745.

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Date submitted: 27 Dec 2012

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