

Architecture and Locomotion

R. E. L. Turner

Department of Mathematics
University of Wisconsin - Madison
480 Lincoln Drive, Madison, WI, 53706 USA
turner@math.wisc.edu

ABSTRACT

Ascaris suum is a parasitic nematode that lives in pigs' intestines. It is a tempting subject for neurophysiologists in that it is 'simple', having only 300 neurons, about 80 of which are associated with locomotion. The muscular and neural structures are quite well understood, but the means by which they produce locomotion are not. In earlier work we developed a dynamic model for a single muscle cell; the model showed remarkably good correspondence with the voltage dynamics recorded in the laboratory. Here we use collections of model cells to represent dorsal and ventral muscle chains in the worm. The neuromuscular architecture in *Ascaris* is extremely complicated; we show, however, that by using suitable synaptic links between the model cells, we can create propagating waves of voltage variation that correspond to fictive motion.

Key Words: Locomotion, muscle, neuron

AMS Classification: 37N25, 92C30.

References

- [1] R. E. L. Turner, *A model for an Ascaris muscle cell*, *Experimental Physiology*, **86.5** (2001), 551-559.