

Abstract Submitted
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Transition of torque pattern in undulatory locomotion due to wave number variation in resistive force dominated media¹ YANG DING, TINGYU MING, Beijing Computational Science Research Center — In undulatory locomotion, torque (bending moment) is required along the body to overcome the external forces from environments and bend the body. Previous observations on animals using less than two wavelengths on the body showed such torque has a single traveling wave pattern. Using resistive force theory model and considering the torque generated by external force in a resistive force dominated media, we found that as the wave number (number of wavelengths on the locomotor's body) increases from 0.5 to 1.8, the speed of the traveling wave of torque decreases. When the wave number increases to 2 and greater, the torque pattern transits from a single traveling wave to a two traveling waves and then a complex pattern that consists two wave-like patterns. By analyzing the force distribution and its contribution to the torque, we explain the speed decrease of the torque wave and the pattern transition.

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Yang Ding
Beijing Computational Science Research Center

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