Flexibility Enhanced Propulsion at Low Reynolds Number

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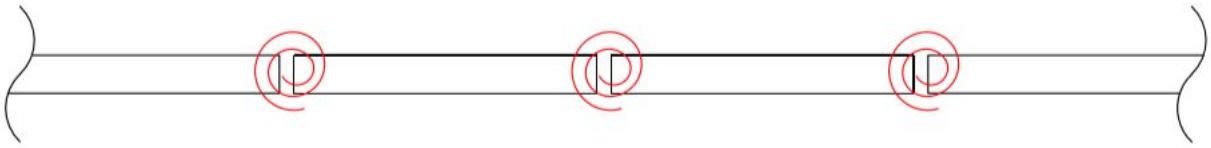

Figure 1: Alternative discrete model

This project aims to validate the work of previous members of this research group on the generation of net thrust by microscopic swimmers. At the small scale considered, low Reynolds numbers lead to conditions in which inertia is negligible and viscous forces dominate. Various previous works have demonstrated that in these conditions, a reciprocating propelling filament is not able to generate any net thrust. In order to generate thrust, the introduction of a varying flexibility along the length of the filament is required. Previous members of this group studied this topic through the modeling of the filament continuously. In this project, the validation of this work is done through the creation of a discrete model, in which the filament consists of many small segments connected to one another via torsional springs. The torsional spring stiffness values provide the means through which the varying stiffness distribution is modeled.

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