HYDRODYNAMIC INTERACTIONS BETWEEN SEMIFLEXIBLE FILAMENTS

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Some biological filaments at physiological temperatures behave as semiflexible filaments, they are described by the worm-like chain model. The cytoskeletal structure of the cell is constituted of actin filaments and microtubules, which are semiflexible. The DNA is another semiflexible filament.
They are mesoscopic objects that are suspended in a fluid, they live in a low Reynolds number regime and the hydrodynamic interactions (HI) are relevant to study their collective dynamics. We present a model that solves numerically the equations of motion of a discretized and inextensible filament suspended in a fluid, taking into account the HI.

1. The motion of a filament under a uniform field is already studied [1]. Here, we analyze in detail how this motion and morphology changes by the presence of other filaments.

2. We modelize a flagella as a semiflexible filament driven at one end. The velocity of a flagella changes by the presence of other driven filaments and these changes depend on the flexibility of the chain and on the number of flagella in the suspension.

[1] M. Cosentino Lagomarsino, I. Pagonabarraga and C.P. Lowe, Phys. Rev. Lett. **94**, 148104 (2005).