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# Stochastic averaging for multiple cooperative and antagonistic molecular motors

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## Abstract

We study a system of stochastic differential equations which describe the procession of multiple molecular motors carrying a cargo along a microtubule. For cooperative motors we can obtain, through averaging principles, effective statistics for motor velocities for several models of motor attachment and detachment. The assumption of various time scales needed to obtain accurate averaging estimates are no longer valid with antagonistic motors systems. We discuss methods for overcoming such difficulties, and conclude with simulations comparing various models.