

Master 2 Internships Complex networks

Title: Study of interevent time distributions for different pedestrian models.

Summary: Face-to-face contact networks originate from interactions occurring in the physical space. As such, they are a summary observable derived from the more complex dynamics of agents moving and interacting in a 2D space. Some properties of empirical temporal networks seem to be robust across social contexts. The distribution of intercontact durations $\Delta\tau$ is one of them. Early results seem to indicate that such distributions are not the consequence of a complex mechanism, but might rather be similar for any model of active particles in a 2D space.

The goal of this internship is to first test this hypothesis by implementing several simple models for active particles (Brownian motion, Fractional brownian motion, Lévy flights, Active brownian particles (Vicsek models), Pedestrian models, etc) and comparing distributions of $\Delta\tau$ across them. Second, provided that the numerical tests show indeed that the typical shape for these distribution is the same, we will try to find analytical explanations for such a phenomenon. The project fits in the field of active matter, and requires both numerical and theoretical modeling.

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