

RIGOROUS APPROXIMATIONS FOR INTERACTING PARTICLE SYSTEMS ON LARGE SPARSE GRAPHS

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Many physical phenomena are modelled by large collections of randomly evolving particles in which the instantaneous evolution of the state of each particle depends only on the states of particles in its neighborhood with respect to an underlying interaction graph. While classical work, falling under the rubric of mean-field approximations, has focused on the case when this interaction graph is dense, most real-world networks are sparse and often random. We describe recent developments that provide asymptotically exact approximations for such interacting particle systems in the complementary case when the graph is sparse.