



Simulation of the M13 infection in E.coli

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Abstract:

Escherichia coli (E. coli) is the most widely studied prokaryotic organism, and an important species served as host organism in microbiology. It is known that M13, a phage that infects E. coli, infection does not kill the host cell, and it leads researcher to study the dynamics of M13 infection of E. coli so that we understand and manipulate their cellular behavior. We develop a realistic computational model of E. coli infected with M13 phages, whose reactions are related to underlying biological mechanisms with measurable quantities. We match model predictions to experimental results, and the simulation result shows the growth of the infected E. coli and production of phages with corresponding phage coat proteins. Furthermore, we mention that the M13 infection model can be applied to implement a fault-tolerant cells communication model via M13 phages in a distributed approach.