Title: Sequential Monte Carlo Methods
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Abstract: The thesis summarizes theoretical foundations of sequential Monte Carlo methods with a focus on the application in the area of particle filters; and basic results from the theory of nonparametric kernel density estimation. The summary creates the basis for investigation of application of kernel methods for approximation of densities of distributions generated by particle filters. The main results of the work are the proof of convergence of kernel estimates to related theoretical densities and the specification of the development of approximation error with respect to time evolution of a filter. The work is completed by an experimental part demonstrating the work of presented algorithms by simulations in the MATLAB® computational environment.

Keywords: sequential Monte Carlo methods, particle filters, nonparametric kernel estimates