

Statistical Space Control in Non-linear Systems: Speed Gradient Method

S. V. Borisenok

Physical Department,
Herzen State Pedagogical University,
Moika River Embankment 48,
191186 St. Petersburg, Russia.
E-mail: sebori@mail.ru

Abstract

Here we discuss the application of control theory to dynamical non-linear systems in the form of speed gradient method. This approach can be practically used for the space focusing of classical or quantum particles, for instance, in nanolithography with the beams of cooled atoms. Standard speed gradient method works here not very efficient because it allows to achieve the selected level of *energy* (the eigenfunction of Hamiltonian for dynamical differential equation). For the practical purposes we re-formulate the mathematical task and introduce principally new type of controlled systems. We demand achievement of the *space* distribution of the dynamical particles. Additionally we investigate the *statistical* properties of the particle dynamics but not the behavior of the single particle. Efficiency of the approach was verified by means of computer simulations.