Mathematical Methods of Optimization of Charged Particle Beams Dynamics, D.A. OVSYANNIKOV, SPbSU - At present, mathematical methods of modelling and optimization are extensively used in many fields of science and technology. Development of specialized software for various applications becomes of ever increasing importance. A special class of the problems attracting attention of numerous researches is represented by the problems associated with the beam dynamics formation in accelerators. The paper deals with optimization problems of charged particle beam dynamics in Linac. The theory of the optimal beam dynamics formation in both accelerating and focusing structures is suggested. Different mathematical control models describing beam dynamics are presented. Especially we consider the problems connected with taking into account of charged particles interaction. New classes of functionals are introduced for the estimation of beam dynamics. The optimization methods are developed for the presented functionals. They are used for the solving of various beam dynamics problem in different accelerating and focusing structures.