At mathematical modeling of real motion of open dynamic systems is important for the correct choice of mathematical model of external impact to system. In the given work the problem of synthesis of mathematical model of external impact to open dynamic system is considered. Let response of some dynamic system the motion of which is described by ODE is connected to external load by the equation

$$\tilde{A}z = \tilde{u}. \tag{1}$$

It is assumed that the mathematical description $\tilde{A}$ of dynamic system motion is not exact and that it is one of the possible equivalent descriptions from given set of the mathematical descriptions K_A, thus $\tilde{A} \in K_A$. Besides it is assumed that the experimentally measured response of system has a known error δ. The problem of synthesis of model of external impact z^{opt} which provides the best results of mathematical modeling uniformly for all operators $\tilde{A} \in K_A$ is considered here as extreme problem:

$$\| \tilde{A}z^{opt} - \tilde{u} \|_U \leq \inf_{\tilde{z}} \sup_{A_\alpha \in K_A} \| A_\alpha \tilde{z} - \tilde{u} \|_U forall \tilde{A} \in K_A,$$

where $\tilde{z}$ is the solution of extreme problem

$$\Omega[\tilde{z}] = \inf_{z \in \tilde{Q}} \Omega[z],$$

$\Omega[z]$ is stabilized functional, $\tilde{Q}$ is set of the possible solutions of equation (1). The function z^{opt} was defined the optimal mathematical model of external impact for all class K_A.

Theorem. The function z^{opt} exist and steady to small variations of initial data.The possible algorithm of construction of function z^{opt} is offered in this work.