8th Central European Congress on Food

Food Science for Well-being

23-26 May 2016, Kyiv, Ukraine

UNDER THE AUSPICES OF:

BOOK OF ABSTRACTS

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ВИРОБНИКІВ ДИТЯЧОГО ХАРЧУВАННЯ,
МОЛОЧНОКОНСЕРВНОЇ ТА СОКОВОЇ ПРОДУКЦІЇ
"УКРКОНСЕРВМОЛОКО"

INTERNATIONAL
FOUNDATION FOR
SCIENCE

Kyiv, 2016

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SYNTHESIS OF AUTOMATIC CONTROL SYSTEMS FOR OPTIMIZING MULTILINE FACILITIES IN THE FOOD INDUSTRY

The most automated control systems function under uncertainty which is associated with a lack of information about the object control or inaccuracy of its mathematical model, or output data, etc. Therefore, much attention is paid to the task of management of the uncertain objects. The solution to the problem of constructing optimal control of a linear system, which is influenced by perturbations of unknown nature, is examined and proposed to your consideration.

The dynamics of the object x(t) can be described as follows under the management of $u(t)$ and external disturbances $f_0, f(t)$

$$[\wedge dT = {}^A(t)^x(t) + B(t)«(t) + K(t)f(t), \qquad 0 < t < T, \qquad (1)$$
$$I^*(0) = Lfo,$$

where $x(t)$ eR^n — state vector, $u(t)eR^m$ — vector of control, $f(t)eR'$ — unknown vector of external disturbances which are influencing the system (1), f_0cR' — also unknown vector disturbing system (1) at the starting point of time, T — the initial time, $A(t)<R^{n*n}$, $B(t)eR^{n*m}$, $K(t)eR^{n*r}$, L eR^{n*} — set matrix

The problem of finding the optimal control is satisfied by condition of integral — quadratic optimality criterion.

To solve this problem a name for the disturbance vector and a name for the controlling vector should be entered

$$= \quad Fo^{1/2}fo \quad w(t) \quad = \quad F^{1/2}(t)f \quad (t) \qquad (2)$$

$$v(t) = D^{1/2}(t)u(t),\ B_v(t) = B(t)ZT^{1/2}(t),\ K_w(t) = K(t)F\sim^{1/2}(t),\ L_w = LF_0^{-1/2}, \qquad (3)$$

The Hamiltonian function H (x, v, w, X) of Pontryagin principle is build for solving the mentioned problem. The condition for minimization (maximization) should be considered to get the matrix of Riccati type differential equation. The solution of Riccati type differential equation gives the optimum value of the control functions v(t) and disturbances $w(t)$.

$$v^*(t) = -B^T(t)P(t)x(t)\ ,\ w^*(t) = 4KW(t)P(t)x(t) \ . \qquad (4)$$
$$Y$$

The value of functional calculations after missing intermediate solution could be described as follows

$$JY(v^*, w^*) = wl\,(LWP(O)Lw - Y^2E)Wo \ . \qquad (5)$$

KEY WORDS: *optimization problems, uncertainty, multi object, Hamiltonian, Riccati equation*