

SYNTHESIS OF ALGORITHMS FOR STABILIZATION OF THE LEVEL OF INTER-OPERATIVE BACKLOGS OF THE PRODUCTION FLOW LINE

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The report discusses methods for constructing algorithms for optimal stabilization of the value of inter-operational backlogs $[\chi]_0$ of the production flow line (Fig.1)[1]. Need to find a control action $u_0 \in G_U$, $u_0(t, S) \ll Y_0(t, S)$, ($S \in [0, S_d]$, $t \in [0, T_d]$), on the deviations $[y]_0 = [\chi]_0 - [\chi]_0^*$, ($[y]_0(t, S) \in G_0$, $[y]_1(t, S) \in G_1$), relatively unperturbed state $[\chi]_0^*$ for a given quality criterion of the transient process [2]

$$I = \int_0^\infty \frac{1}{S_d} \int_0^{S_d} u_0^2 dS dt,$$

$$u_0(t, S) = Y_0(t, S) - Y_0^*(t, S),$$

with differential dependencies

$$\frac{\partial [y]_0}{\partial t} = -\frac{\partial [y]_1}{\partial S} + q_{00} u_0,$$

$$\frac{\partial [y]_1}{\partial t} = -\frac{\partial [y]_1}{\partial S} B,$$

initial conditions

$$[y]_0(0, S) = [y]_{00}(S), [y]_1(0, S) = [y]_{11}(S),$$

and control objectives

$$\lim_{t \rightarrow \infty} [y]_0(t, S) = 0, \lim_{t \rightarrow \infty} [y]_1(t, S) = 0,$$

which will provide asymptotic stability of a given program state of the flow line parameters for the transition mode, determined by the Lyapunov function [3]

$$V^0(t, [y]_n) = \frac{1}{S_d} \int_0^{S_d} c_0 ([y]_0(t, S))^2 dS$$

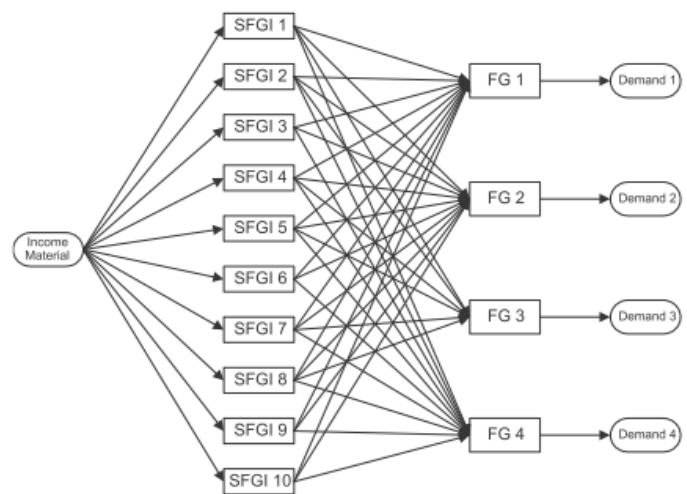


Fig. 1: Typical structure of a production line section

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