THE CONDITION OF STABILITY OF SOLUTIONS OF THE SYSTEM
OF LINEAR STOCHASTIC DIFFERENTIAL EQUATIONS WITH DELAY

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On probability space considering the system of linear stochastic differential equations with delay

$$d[x(t)] = A(t)x(t)dt + B(t)x(t - \tau)dw(t), x(t) \in (R^n).$$

(1)

where \( A(t), B(t) \) — matrix, \( \tau > 0 \) — constant delay, \( w(t) \) — scalar standard Winner process: \( M(dw(t)) = 0, \ M(dw(t))^2 = dt, \ M(dw(t)\ dw(t_1), t \neq t_1) = 0. \)

We find the matrix differential equations for matrix of moments second order of solutions of the system (1) \( D(t) = <X(t)X^*(t)> \) in the form

$$\frac{dD(t)}{dt} = D(t)A^*(t) + A(t)D(t) + B(t)D(t - \tau)B^*(t).$$

(2)

and we find condition of stability in mean square of zero solutions the considerin system.

Theorem. Let as arbitrary initial conditions any solutions of the system of linear differential equations (2) with delay straight to zero matrix. Then the zero solutions of the system of linear stochastic differential equations (1) is asymptotic stability in mean square.