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In this article proposals technique with pomoshchju kotoroj can be morethan just pick vozdushnoy pressure of a camera at pressyometra Pneumatic pressure measurements in the soil.
Voltage, pressyometrы, deformation.

The paper proposes method by which it is possible to more accurately pick up pressure in air chamber of pneumatic pressure measurements pressuremeter soil.
Stress, presiometr, deformation.

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SLABOZBURENA linear boundary problems For systems with impulsive

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The proposed scheme of coefficient of conditions of existence of solutions of weakly perturbed linear boundary value problems for impulsive systems at fixed times.
Matrix Green Cauchy problem, matrix-ortoproektor, generalized Green's operator method Vishika-Lyusternika.

Problem. Thought to exist uncertainty in the scheme of coefficient of Existence conditions of weakly perturbed linear boundary value problems for impulsive systems at fixed times.

Analysis of recent research. We consider the linear boundary value problem for systems of ordinary differential equations with impulsive form [1-3]:

$$\begin{cases} \dot{z} = A(t)z + f(t),\ t \neq \tau_i \ \in [a,b],\ \ i \in Z, \\ \Delta z_{|t=\tau_i} = S_i z + a_i, \\ lz = \alpha, \end{cases} \quad (1)$$

where $A(t)$, -dimensional Matrix and vector functions -dimensional respectively; - The space of continuous or piecewise continuous vector functions on which have gaps in the first kind with; - -dimensional Constant matrix such that not degenerate; - Limited linear m-dimensional vector funtsional.$f(t) \in \mathrm{C}([a,b]\{\tau_i\}_I) - (n \times n)(n \times 1)\mathrm{C}([a,b]\backslash \{\tau_i\}_I)[a,b]tt = \tau_i S_i (n \times n)\mathrm{E} + S_i a_i \in R^n;\ -\infty < a < \tau_1 < \ldots < \tau_i < \cdots < \tau_p < b < +\infty,\ \ i = 1, \ldots, p;\ \ l = col(l_1 \ldots l_m)$

The purpose of research. To substantiate the finding of coefficient Existence conditions of weakly perturbed linear boundary value problems for impulsive systems at fixed times.

Results. Theorem 1. (critical case) If the corresponding (1) homogeneous boundary value problem of impulsive and has only -linearly independent solutions. Heterogeneous boundary value problem of impulsive (1) cheeky if and only if:$rank\ Q = n_1 < n(f(t) = 0, a_i = 0, \alpha = 0)r = n - n_1 r$

$$f(t) \in \mathrm{C}([a,b]\backslash\{\tau_i\}_I), a_i \in R^n, \alpha \in R^m,$$

satisfy the condition:

$$P_{Q_d^*}\left\{\alpha - l\int_a^b K(\cdot,\tau)f(\tau)d\tau - l\sum_{i=1}^{p} \overline{K}(\cdot,\tau_i)a_i\right\} = 0, d = m - n_1 \quad (2)$$

and thus has -parametrychne family roz'yazkiv:r

$$z_0\ (t, \mathrm{c}_r) = X_r(t)c_r + \left(G\begin{bmatrix} f(\tau) \\ a_i \end{bmatrix}\right)(t) + X(t)Q^+ \alpha, \quad (3)$$

where - normal fundamental matrix corresponding to (1) a homogeneous system; - Green Cauchy matrix system (1) with pulses:$X(t)X(a) = E(f(t) = 0, a_i = 0)K(t,\tau)$

$$K(t,\tau) = \begin{cases} X(t)X^{-1}(\tau), a \le \tau \le t \le b; \\ 0, \quad\quad a \le t < \tau \le b; \end{cases}$$

$\overline{K}(t,\tau) = K(t, \tau_i + 0);$ - Permanent dimensional matrix; dimensional matrix pseudoinverse to Moore-Penrose on; dimensional matrix -ortoproektor; - Matrix, the columns of which is a complete system -linearly independent solutions of the homogeneous boundary value problem of impulsive - matrix lines which is a complete system of linearly independent rows of the matrix; - Generalized Green's operator, defined by the formula:$Q = lX(\cdot) - (m \times n)Q^+ -\ (n \times m) - QP_{Q_2^*}: R^m \to N(Q^*) - (m \times n) - P_{Q^*}^2 = P_{Q^*} = P_{Q^*}^*;\ X_r(t) - (n \times r)r(f(t) = 0, a_i = 0, \alpha = 0);\ \ P_{Q_d^*} - (d \times m)dP_{Q^*}G$

$$\left(G\begin{bmatrix} f \\ a_i \end{bmatrix}\right)(t)$$

$$\stackrel{\text{def}}{=} \left(\left[\int_a^b K(t,\tau) * d\tau - X(t)Q^* l \int_a^b K(\cdot,\tau) * d\tau, \sum_{i=1}^{p} \overline{K}(t,\tau_i) * \right.\right.$$

$$\left.\left. - X(t)Q^+ l \sum_{i=1}^{p} \overline{K}(\cdot,\tau_i)\right]\right)\begin{bmatrix} f(\tau) \\ a_i \end{bmatrix} \qquad (4)$$

Theorem 1, formulated in general terms, received the following statement for non-critical boundary problems.

Theorem 2 (non-critical case) If the corresponding (1) homogeneous boundary value problem of impulsive has only a trivial solution. Heterogeneous boundary value problem of impulsive (1) cheeky if and only if:$rank\ Q = n_1 = n(f(t) = = 0, a_i = 0, \alpha = 0)$

$$f(t) \in C([a,b]\backslash\{\tau_i\}_I), a_i \in R^n, \alpha \in R^m$$

satisfy the condition:

$$P_{Q_d^*}\left\{\alpha - l\int_a^b K(\cdot,\tau)f(\tau)d\tau - l\sum_{i=1}^{p}\overline{K}(\cdot,\tau_i)a_i\right\} = 0, d = m - n \qquad (5)$$

with a unique solution:

$$z_0\,(t) = \left(G\begin{bmatrix} f \\ a_i \end{bmatrix}\right)(t) + X(t)Q^+ a, (X_r(t) = 0), \qquad (6)$$

where the generalized Green's operator defined by the formula (4). If this functionality is that fair value:$\left(G\begin{bmatrix} f \\ a_i \end{bmatrix}\right)(t)l$

$$l\int_a^b K(\cdot,\tau) * d\tau = \int_a^b lK(\cdot,\tau) * d\tau,$$

then generalized Green's operator has the image:

$$\left(G\begin{bmatrix} f \\ a_i \end{bmatrix}\right)(t) \stackrel{\text{def}}{=} \left(\left[\int_a^b G_0(t,\tau) * d\tau, \sum_{i=1}^{p}\overline{G_0}(t,\tau_i) * \right]\right)\begin{bmatrix} f(\tau) \\ a_i \end{bmatrix},$$

the core of which is called generalized Green's matrices of boundary value problem (1) with no pulse.$G_0(t,\tau) = K(t,\tau) - X(t)Q^+ lK(\cdot,\tau), \overline{G_0}(t,\tau_i) = G_0(t,\tau_i + 0)$

Considered slabozburena linear inhomogeneous boundary value problem of impulsive:

$$\begin{cases} \dot{z} = A(t)z + \varepsilon A_1(t)z + f(t),\ t \neq \tau_i; \\ \Delta z_{|t=\tau_i} - S_i z = a_i + \varepsilon A_{1i} z(\tau_i - 0); \\ lz = \alpha + \varepsilon l_1 z \end{cases} \qquad (7)$$

the assumption that the boundary problem generating impulsive (1) there is no solutions at random inhomogeneities $f(t) \in C([a,b]\backslash\{\tau_i\}_I), a_i \in R^n$, $\alpha \in R^m$.

By Theorem 1 it means that the criterion for solvability of (2) is not satisfied:$rank\ Q = n_1 < n$

$$P_{Q_d^*}\left\{\alpha - l\int_a^b K(\cdot,\tau)f(\tau)d\tau - l\sum_{i=1}^{p}\overline{K}(\cdot,\tau_i)a_i\right\} \neq 0.$$

Treats and solved the problem of finding conditions on the perturbations terms, under which the problem (7) is solved for arbitrary:$\varepsilon A_1(t), \varepsilon A_{1i}\varepsilon l_1$

$$f(t) \in \mathrm{C}([a,b]\backslash\{\tau_i\}_I), a_i \in R^n, \alpha \in R^m.$$

On the basis of the type Vishika-Lyusternika obtained coefficients Existence conditions of the boundary value problem (7) at random:

$$f(t) \in \mathrm{C}([a,b]\backslash\{\tau_i\}_I), a_i \in R^n, \alpha \in R^m.$$

For these conditions is based -dimensional matrix:$(d \times r)$

$$B_0 = P_{Q_d^*}\left[l_1X_r(\cdot) - l\int_a^b K(\cdot,\tau)A_1(\tau)X_r(\tau)d\tau - l\sum_{i=1}^{p}\overline{K}(\cdot,\tau_i)A_{1i}X_r(\tau - 0)\right]. \quad (8)$$

Application of Vishika-Lyusternika allows you to find effective coefficient conditions for the existence of solutions of boundary value problem (7) as a Laurent series in the small parameter pn-powers of finite number of terms containing negative degree. The theorem that allows to solve the problem. Before formulate it, we introduce the following notation: - - dimensional matrix ortoproektor: - dimensional matrix ortoproektor: $\varepsilon\varepsilon P_{B_0}(r \times r)\ R^r \to N(B_0); P_{B_0}^* - (d \times d)R^d \to N(B_0^*)$.

Theorem 3. Let the boundary value problem (7) satisfies the above conditions so that there is a critical event () and generating boundary value problem of impulsive (1) with random inhomogeneities:$rank\ Q = n_1 < n$

$$f(t) \in \mathrm{C}([a,b]\backslash\{\tau_i\}_I), a_i \in R^n, \alpha \in R^m$$

has no solutions. Then, if the following conditions are satisfied:

$$P_{B_0} = 0,\ \ P_{B_0^*}P_{Q_d^*} = 0 \quad (9)$$

then the boundary value problem (7) exists at random:

$$f(t) \in \mathrm{C}([a,b]\backslash\{\tau_i\}_I), a_i \in R^n, \alpha \in R^m$$

a unique solution in the form at convergent series:$\varepsilon \in (0, \varepsilon_*]$

$$z\,(t,\varepsilon) = \sum_{i=1}^{+\infty} \varepsilon^i z_i(t);$$

If condition (9) is not met, the sufficient conditions for the existence of solutions of boundary value problem (7) at random:

$$f(t) \in \mathrm{C}([a,b]\backslash\{\tau_i\}_I), a_i \in R^n, \alpha \in R^m$$

should involve measurable matrix:$(d \times r) -$

$$B_1 = P_{Q_d^*}\left\{l_1G_r(\cdot) - l\int_a^b K(\cdot,\tau)A_1(\tau)G_1(\tau)d\tau - l\sum_{i=1}^{p}\overline{K}(\cdot,\tau_i)A_{1i}G_1(\tau_i - 0)\right\} \quad (10)$$

where.$G_1(t) = \left(G\begin{bmatrix} A_1(\tau)G_{00}(\tau) \\ A_{1i}G_{00}(\tau_i - 0)\end{bmatrix}\right)(t) + X(t)Q^* l_1 G_{00}(\cdot)G_{00}(t) = X_r(t)$

For this case proved the following proposition.

Theorem 4. Let relative to the boundary value problem (7) the conditions listed above. Then just following statements are equivalent:

a) for arbitrary i boundary value problem (7) has a unique solution in the form of a convergent series at:$f(t) \in C([a,b]\backslash\{\tau_i\}_I),\ a_i \in \mathbb{R}^n\ \alpha \in \mathbb{R}^m z(t,\varepsilon)\varepsilon \in (0,\varepsilon_*]$

$$z\,(t,\varepsilon) = \sum_{i=-2}^{+\infty} \varepsilon^i z_i(t);$$

b) an arbitrary constant -dimensional vector -dimensional algebraic system:$r\varphi_0 \in \mathbb{R}^r\ (1 \le r \le n)r$

$$(B_0 + \varepsilon B_1 + \cdots)u_\varepsilon = \varphi_0,$$

has a unique solution in the form of a convergent series at:$\varepsilon \in (0,\varepsilon_*]$

$$u_\varepsilon = \sum_{i=-1}^{+\infty} \varepsilon^i u_i;$$

c) the conditions:

$$P_{B_0} \ne 0,\ \ P_{B_0}P_{B_1} = 0, \qquad P_{B_0^*}P_{B_1^*}P_{Q_d^*} = 0.$$

The conditions ensure uniqueness, and the condition - the existence of solutions.$P_{B_0} \ne 0,\ \ P_{B_0}P_{B_1} = 0 P_{B_0^*}P_{B_1^*}P_{Q_d^*} = 0$

Conclusion. If the condition is not fulfilled, the sufficient conditions for the existence of solutions of boundary value problem (7) with random inhomogeneities should be involved - dimensional matrix (10). Solution boundary value problem (1) is sought in this case in the form at convergent series.$P_{B_0} = 0,\ \ P_{B_0^*}P_{Q_d^*} = 0 f(t) \in C([a,b]\backslash\{\tau_i\}_I),\ a_i \in \mathbb{R}^n, \alpha \in \mathbb{R}^m (d \times r) B_1 z\,(t,\varepsilon)\varepsilon \in (0,\varepsilon_*]$

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Proposals schema definitions coefficient uslovyy occurrence of solutions slabovozmuschennыh neodnorodnyh kraevyh linear problems for systems with ympulsnым Impact in fyksyrovannыe momentы time.

Matrix Green, Cauchy problem, matrix-ortoproektor, obobschennыy Green operator, line-Lyusternik method.

The chart of determination of coefficient terms of oridin of decisions of weaknonlinear regional tasks for systems with impulsive influence in fixed moments of time is offered.

Matrix Green, Cauchy problem, matrix-ortproektor, Green operator, line-Lyusternik method.

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Determination of harvesting-transport complex WITH TRUCK Tipper trucks

SG Fryshev, PhD

The technique determination of assembly-transport complex for cerealsusing variables automotive semi trucks.

Grain, carriage, Car trailers, minimizing downtime transport performance.

Problem. It is known that the introduction of technology line between harvesters and vehicles intermediate reloading link allows significantly compared with direct road transport, reduce time harvesting and transport operations.

Along with the significant advantages of handling technology using specialized trailers - Conveyors it causes significant (36%) of simple cars [1]. Another method of handling technology implementation is to use compensators as motor vehicle (NP) trucks. This option becomes practical application of technology in recent years due to the development and

industrial introduction of a special truck tractor unit similar in design to the car. This device significantly reduces time spent on coupling - vidchiplennya emergency and improves the efficiency of grain transportation technology by eliminating downtime vehicles. Therefore, an important development methods of study options harvesting and transport complex (ZTK) for transshipment version of this technological scheme.

Analysis of recent research. The role of compensators can perform automobile and tractor trailers conveyors (PP), semi-variable body, various bunkers [2-4]. The most common compensator in manufacturing is a tractor trailer-reloader. Analysis of circuits transporting grain from harvesting using PE reveals a number of