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ИЗВЕСТИЯ

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PROBLEM ON THE DISTRIBUTION OF THE HARMONIC TYPE RELAY WAVE

Abstract. In this paper, we study the class of flat problems on the effect of moving loads on the surface of a laminated plate. The problems of this class are of great practical interest and in addition, can serve as a benchmark for the development of certain numerical algorithms for solving dynamic problems.

Among various periodic and non-periodic motions of deformable medium, plane waves of simple harmonic type, distributed along the surface of a body or half-plane, whose influence is limited by the vicinity of this surface, are of great importance. Therefore, we consider the problem of the distribution of the relay wave.

Key words: stratified plates, live-load, waves of Relay, wave equalization.

The equation of motion of a half-plane material in potentials φ , ψ is described by wave equations.

$$\frac{\partial^2\varphi}{\partial x^2}+\frac{\partial^2\varphi}{\partial z^2}=\frac{1}{a^2}\frac{\partial^2\varphi}{\partial t^2};$$

$$\frac{\partial^2\psi}{\partial x^2}+\frac{\partial^2\psi}{\partial z^2}=\frac{1}{b^2}\frac{\partial^2\psi}{\partial t^2}, \tag{1}$$

where a and b are the distribution speed of the longitudinal and transverse wave, respectively.

We assume that the boundary of the half-plane z=0 is stress-free, i.e.

$$\sigma_{zz}=\sigma_{xz}=0 \qquad (z=0) \tag{2}$$

Let there be an elastic half-plane $z \le 0$.

Suppose that a flat harmonic wave propagates in the medium, i.e. potentials φ и ψ will be given in the form of [1]

$$\varphi(x,z,t)=\Phi_0(z)\exp[i(pt-qx)]; \qquad \psi(x,z,t)=\Psi_0(z)\exp[i(pt-qx)], \tag{3}$$

Φ_0 and Ψ_0 satisfies the equations

$$\Phi_0''-\left(q^2-\frac{p^2}{a^2}\right)\Phi_0=0; \qquad \Psi_0''-\left(q^2-\frac{p^2}{b^2}\right)\Psi_0=0. \tag{4}$$

Considering oscillations dacaying with depth $z\to-\infty$, there must be met condition

$$q^2-\frac{p^2}{a^2}>0; \qquad q^2-\frac{p^2}{b^2}>0; \tag{5}$$

But since the speeds *a* and *b* satisfy the inequality $a > b$, it suffices to fulfill one condition instead of conditions (5)

$$\frac{p}{q} < b \tag{6}$$

Therefore, solutions of equations (4), dacayed at infinity $z \to -\infty$, have the form

$$\Phi_0(z) = A\exp\left(\sqrt{q^2 - \frac{p^2}{a^2}} \cdot z\right); \qquad \Psi_0(z) = B\exp\left(\sqrt{q^2 - \frac{p^2}{b^2}} \cdot z\right), \tag{7}$$

and for potentials φ и ψ we get expressions

$$\varphi = A\exp\left[i(pt - qx) + \sqrt{q^2 - \frac{p^2}{a^2}} z\right]; \qquad \psi = B\exp\left[i(pt - qx) + \sqrt{q^2 - \frac{p^2}{b^2}} z\right], \tag{8}$$

where A and B are arbitrary constants of integration.

Putting solutions (7) into the boundary conditions (2), we obtain

$$A\left[2 - \left(\frac{p}{qb}\right)^2\right] + 2iB\sqrt{1 - \left(\frac{p}{qb}\right)^2} = 0; \qquad -2iA\sqrt{1 - \left(\frac{p}{qa}\right)^2} + B\left[2 - \left(\frac{p}{qb}\right)^2\right] = 0. \tag{9}$$

In order for the solution of the problem to be non-zero, it is necessary that the determinant of system (9) be non-zero, i.e. to make the relation [2]

$$\left[2 - \left(\frac{p}{qb}\right)^2\right]^2 - 4\sqrt{1 - \left(\frac{p}{qb}\right)^2}\sqrt{1 - \left(\frac{p}{qa}\right)^2} = 0. \tag{10}$$

The ratio (p/q) is called the propagation velocity of the relay surface wave.

Denoting $\xi = \left(\frac{p}{qb}\right)^2$ and introducing the Poisson's ratio ν, from relation (10) we obtain the equation for the dimensionless velocity of the relay surface wave $\sqrt{\xi}$:

$$\xi^3 - 8\xi^2 + 8\xi\frac{2-\nu}{1-\nu} - 8\frac{1}{1-\nu} = 0. \tag{11}$$

Equation (11) has a single real positive root [1, 3,4].

If through z_1 и z_2 and designate the depth of penetration at which the amplitude of the voltage drops in e times due to the longitudinal and transverse wave, respectively, then for them we get the expression

$$z_1 = -\frac{l}{2\pi\sqrt{1 - a^{-2}b^2\xi}}; \qquad z_2 = -\frac{l}{2\pi\sqrt{1-\xi}},$$

at the same time $l = \frac{1}{q}$ - the wavelength. For example, with $\nu = 0{,}5$ we have

$$z_1 = -\frac{l}{2\pi}; \qquad z_2 \cong -\frac{l\sqrt{10}}{2\pi}.$$

Let the normal and tangential load intensity $-F_1(x+Dt)$ и $-F_2(x+Dt)$ be distributed on the surface $z = 0$ with constant speed D i.e. when $z = 0$ we have boundary conditions

$$\sigma_{zz} = -F_1(x+Dt); \ \sigma_{xz} = -F_2(x+Dt). \tag{12}$$

Initial conditions for such a problems are absent. [2, 47-50].

We introduce moving coordinates

$$x' = x + Dt; \ \ y' = y,$$

and the strokes in the future for simplicity will be omitted. Then for potentials φ and ψ we get the equations

$$\alpha^2 \frac{\partial^2 \varphi}{\partial x^2} - \frac{\partial^2 \varphi}{\partial z^2} = 0;$$

$$\beta^2 \frac{\partial^2 \psi}{\partial x^2} - \frac{\partial^2 \psi}{\partial z^2} = 0;$$

$$\alpha^2 = (D/a)^2 - 1; \ \beta^2 = (D/b)^2 - 1. \tag{13}$$

General solutions of equations (13) are d'Alembert method and have the form

$$\begin{aligned} \varphi(x,z) &= \varphi_1(x+\alpha z) + \varphi_2(x-\alpha z); \\ \psi(x,z) &= \psi_1(x+\beta z) + \psi_2(x-\beta z). \end{aligned} \tag{14}$$

By virtue of the absence of reflected waves from the lower infinitely distant boundary of the function φ_2 and ψ_2 should go to zero and for φ_1 and ψ_1 from the boundary conditions (12) we obtain the functional relations [5]

$$\begin{aligned} (\beta^2 - 1)\varphi_1''(x) - 2\beta\psi_1''(x) &= -\frac{F_1(x)}{\rho D^2}(\beta^2+1)H(x); \\ 2\alpha\varphi_1''(x) + (\beta^2-1)\psi_1''(x) &= -\frac{F_2(x)}{\rho D^2}(\beta^2+1)H(x). \end{aligned} \tag{15}$$

From relations (15) we get

$$\varphi_1''(x) = \frac{\beta^2+1}{\rho D^2}\left[(\beta^2-1)F_1(x) + 2\beta F_2(x)\right]H(x)\Delta^{-1};$$

$$\psi_1''(x) = \frac{\beta^2+1}{\rho D^2}\left[2\alpha F_1(x) - (\beta^2-1)F_2(x)\right]H(x)\Delta^{-1};$$

$$\Delta = 4\alpha\beta + (\beta^2-1)^2. \tag{16}$$

Using dependencies (16) for stress values, we obtain the expression

$$\Delta \cdot \sigma_{xx} = -\left(\beta^2 - 2\alpha^2 + 1\right)\left[\left(\beta^2 - 1\right)F_1\left(x + \alpha z\right) + 2\beta F_2\left(x + \alpha z\right)\right]\times$$
$$\times H\left(x + \alpha z\right) + 2\beta\left[2\alpha F_1\left(x + \beta z\right) - \left(\beta^2 - 1\right)F_2\left(x + \beta z\right)\right]H\left(x + \beta z\right);$$

$$\Delta \cdot \sigma_{zz} = -\left(\beta^2 - 1\right)\left[\left(\beta^2 - 1\right)F_1\left(x + \alpha z\right) + 2\beta F_2\left(x + \alpha z\right)\right]H\left(x + \alpha z\right) -$$
$$- 2\beta\left[2\alpha F_1\left(x + \beta z\right) - \left(\beta^2 - 1\right)F_2\left(x + \beta z\right)\right]H\left(x + \beta z\right); \quad (17)$$

$$\Delta \cdot \sigma_{xz} = -2\alpha\left[\left(\beta^2 - 1\right)F_1\left(x + \alpha z\right) + 2\beta F_2\left(x + \alpha z\right)\right]H\left(x + \alpha z\right) +$$
$$+ \left(\beta^2 - 1\right)\left[2\alpha F_1\left(x + \beta z\right) - \left(\beta^2 - 1\right)F_2\left(x + \beta z\right)\right]H\left(x + \beta z\right);$$

$$H(\varsigma) = \begin{Bmatrix} 1, & \varsigma \ge 0 \\ 0, & \varsigma < 0 \end{Bmatrix},$$

and for shift u and w accordingly

$$u = -\frac{\beta^2 + 1}{\rho D^2 \Delta}\left[\left(\beta^2 - 1\right)F_3\left(x + \alpha z\right) + 2\beta F_4\left(x + \alpha z\right)\right]H\left(x + \alpha z\right) +$$
$$+ \beta\frac{\beta^2 + 1}{\rho D^2 \Delta}\left[2\alpha F_3\left(x + \beta z\right) - \left(\beta^2 - 1\right)F_4\left(x + \beta z\right)\right]H\left(x + \beta z\right);$$
$$w = -\alpha\frac{\beta^2 + 1}{\rho D^2 \Delta}\left[\left(\beta^2 - 1\right)F_3\left(x + \alpha z\right) + 2\beta F_4\left(x + \alpha z\right)\right]\times$$
$$\times H\left(x + \alpha z\right) - \frac{\beta^2 + 1}{\rho D^2 \Delta}\left[2\alpha F_3\left(x + \beta z\right) - \left(\beta^2 - 1\right)F_4\left(x + \beta z\right)\right]H\left(x + \beta z\right) \quad (18)$$

where $F_3(x) = \int_0^x F_1(\xi)d\xi;\ F_4(x) = \int_0^x F_2(\xi)d\xi.$

Let it be $F_2 = 0$ and consider the stress σ_{xx} on the boundary $z = 0$. We obtain

$$\sigma_{xx} = F(\nu, D_0)F_1(x);\ D_0 = D/a,$$

where $F(\nu, D_0) = \dfrac{A_1(\nu, D_0) - A_2(\nu, D_0)B(\nu, D_0)}{A_1(\nu, D_0) - A_2(\nu, D_0)};$

$$A_1 = (1 - 2\nu)^{3/2}\sqrt{\left(D_0^2 - 1\right)(1 - \nu) - (1 - 2\nu)};$$

$$A_2 = \left[D_0^2(1 - \nu) - (1 - 2\nu)\right];$$

$$B = \left[D_0^2(1 - \nu) - \left(D_0^2 - 1\right)(1 - 2\nu)\right].$$

Let an elastic layer $0 \ge z > -h$ $|x| < \infty$ lie on the half-space $z \le -h$, over the surface of which the normal load is distributed, i.e. when $z = 0$ we have boundary conditions

$$\sigma_{zz}^{(0)} = -F(x + Dt); \qquad \sigma_{xz}^{(0)} = 0. \quad (19)$$

The sizes and parameters of the layer will be denoted by the index "0", and the half-space - by the index "1".

At the contact boundary $z = -h$, you can set the conditions: hard contact

$$\sigma_{zz}^{(0)} = \sigma_{zz}^{(1)}; \quad \sigma_{xz}^{(0)} = \sigma_{xz}^{(1)}; \quad u_0 = u_1; \quad w_0 = w_1; \tag{20}$$

perfect contact

$$\sigma_{zz}^{(0)} = \sigma_{zz}^{(1)}; \quad \sigma_{xz}^{(0)} = \sigma_{xz}^{(1)} = 0; \quad w_0 = w_1; \tag{21}$$

Can be set other conditions for $z = -h$.

In moving coordinates, solutions of equations for potentials in a layer and a half-plane have the form [3, 171-176].

$$\alpha_j^2 \frac{\partial^2 \varphi_j}{\partial x^2} - \frac{\partial^2 \varphi_j}{\partial z^2} = 0; \quad \beta_j^2 \frac{\partial^2 \psi_j}{\partial x^2} - \frac{\partial^2 \psi_j}{\partial z^2} = 0;$$

$$\left(x' = \frac{x + Dt}{h}; \; y' = \frac{y}{h}; \; \varphi_0 = \frac{\varphi_0}{h^2}; \; \psi_0 = \frac{\psi_0}{h^2} \right). \tag{22}$$

Putting (22) into the boundary conditions (20), we obtain a system of functional equations which using in expressions for displacements u_j, w_j and stresses σ_{ij}, we obtain the solution of the problem.

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ГАРМОНИКАЛЫҚ ТИПТЕГІ РЕЛЕЙ ТОЛҚЫНДАРЫНЫҢ ТАРАЛУЫ ЖАЙЛЫ ЕСЕП

Аннотация. Жұмыста қатпарлы пластинкалардың бетіне қозғалмалы жүктемелердің әсері туралы бірнеше жазық есептер класы зеріттеледі. Осы типтес динамикалық есептер проблемалары жайлы смәселелерді шешуге арналған белгілі сандық алгоритмдерді дамытудың негізгі бағыты бола алуымен қызығушылық тудырады. Деформацияланатын ортаның әртүрлі периодты және преиодтты емес қозғалыстарының арасында шектелген дененің бетіне немесе жарты жазықтыққа тарайтын қарапайым гармоникалық үлгідегі жазық толқындар әсер етеді. Сондықтан да Релей толқынының таралуын зерттейтін боламыз.

Түйін сөздер: қатпарлы пластинкалар, қозғалмалы жүктеме, Релей толқындары, толқындар теңлеуі.

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ЗАДАЧА О РАСПРОСТРАНЕНИИ ВОЛНЫ РЕЛЕЯ ГАРМОНИЧЕСКОГО ТИПА

Аннотация. В работе исследуем класс плоских задач о воздействии подвижных нагрузок на поверхность слоистой пластинки. Задачи данного класса представляют большой прикладной интерес и, кроме того, могут служить эталоном для разработки тех или иных численных алгоритмов для решения динамических задач. Среди различных периодических и непериодических движений деформируемых сред важное значение имеют плоские волны простого гармонического типа, распространяющиеся по поверхности тела или полуплоскости, влияние которых ограничивается окрестностью этой поверхности. Поэтому рассмотрим задачу о распространении волны Релея.

Ключевые слова: слоистые пластинки, подвижная нагрузка, волны Релея, волновые уравнение.

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REFERENCES

[1] Filippov I.G., Filippov S.I. Dynamic stability theory of rods. Proceedings of the Russian-Polish seminar. Theoretical Foundations of construction. Warsaw, 1995. P. 63-69.

[2] Filippov I.G. An approximate method for solving dynamic viscoelastic media // PMM. 1979. 43(1). P. 133-137.

[3] Filippov I.G., Filippov S.I., Kostin V.I. Dynamics of two-dimensional composites // Proceedings of the International Conference on Mechanics and Materials, USA, Los Angeles, 1995. P. 75-79.

[4] Seitmuratov A., Medeubaev N., Yeshmurat G., Kudebayeva G. (2018) Approximate solution of the an elastic layer vibration task being exposed of moving load // News of the national academy of sciences of the Republic of Kazakhstan. Series physic-mathematical. 2 (318). P. 54-60 (in Eng.).

[5] Seitmuratov A.Z., Nurlanova BM., Medeubaev N. Equetions of vibration of a two-dimensionally layered plate strictly based on the decision of various boundaty-value problems // Bulletin of the Karaganda university-mathematics. 2017. 3(87). P. 109-116 (in Eng.).

[6] Seitmuratov A., Yergalauova Z., Makhambayeva, Bexeitova A. Axismetric problems of elastic layer oscillation limited by rigid or deformed boundries // News of the national academy of sciences of the Republic of Kazakhstan. Series of geology and technical sciences. 2018. 1. P. 127-135 (in Eng.).

[7] Ashirbayev N., Ashirbayeva Zh., Sultanbek T., Shomanbayeva M. Waves of elastic stresses in the doublyconnected domain // Vestnik KarGU. Cerija matematika. 2018. 2(90). P. 18-25.

[8] Seytmuratov A.Z., Zharylgapova D.M., Medeubaev N.K., Ibraeva A.A. Applied tasks of plates fluctuation under more difficult boundary conditions // News of the National Academy of Sciences of the Republic of Kazakhstan. Series of Geology and Technical Sciences. 2017. 3(423). P. 228-236 (in Eng.).

[9] Ashirbayev N.K., Banas J., Dubiel A. Solvability of an Integral Equation of Volterra-Wiener-Hopf Type // Abstract and Applied Analysis. Vol. 2014 (2014). Article ID 982079. 9 p. DOI 10.1155/2014/982079.

[10] Seitmuratov A., Ramazanov M., Medeubaev N., Kaliev B. Mathematical theory of vibration of elastic or viscoelastic plates, under non-stationary external influences // News of the National Academy of Sciences of the Republic of Kazakhstan. Series of Geology and Technical Sciences. 2017. 4(320). P. 5-14. (in Eng.). https://doi.org/10.32014/2018.2518-170X; ISSN 2518-170X (Online), ISSN 2224-5278 (Print).

[11] Seitmuratov A., Seylova Z.T., Kanibaikyzy K., Smakhanova A.K., Serikbol S.M. Approximate equation plate oscillation for transverse displacement of points of the median plane // News of the National Academy of Sciences of the Republic of Kazakhstan. Series of Geology and Technical Sciences. 2018. 3(429). P. 258-266. (in Eng.). https://doi.org/10.32014/2018.2518-170X; ISSN 2518-170X (Online), ISSN 2224-5278 (Print).

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