$$\frac{\partial^4 u_i(x,y)}{\partial x^4} + 2\frac{\partial^2 u_i(x,y)}{\partial x^2}\frac{\partial^2 u_i(x,y)}{\partial y^2} + \frac{\partial^4 u_i(x,y)}{\partial y^4} = 0\text{, где i=1,2,3,4} \quad (4)$$

Этот факт, в свою очередь означает, что теперь общее решение бигармонического уравнения можно представить в виде рядов

$$u(x,y) = \sum_{n=1}^{\infty} C_{1n} sh\lambda_{1n} x \sin\lambda_{1n} x \, sh\lambda_{1ny} y \sin\lambda_{1n} y + \sum_{n=1}^{\infty} C_{2n} sh\lambda_{2n} x \cos\lambda_{2n} x sh\lambda_{2n} y \cos\lambda_{2n} y +$$

$$+\sum_{n=1}^{\infty} C_{3n} ch\lambda_{3n} x \sin\lambda_{3n} x ch\lambda_{3n} y \sin\lambda_{3n} y + \sum_{n=1}^{\infty} C_{4n} ch\lambda_{4n} x \cos\lambda_{4n} x ch\lambda_{4n} y \cos\lambda_{4n} y$$

Входящие сюда параметры $\lambda_1, \lambda_2, \lambda_3, \lambda_4$ выбираются произвольно, а постоянные C_1, C_2, C_3, C_4 обычно находятся из граничных условий.

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Simulation of Tsunami Effect by Seismic Wave Propagation in Hypoplastic Medium at Vicinity of Free Boundary

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The wave propagation in an elastic inhomogeneous medium with mechanical parameters which are functions of the spatial coordinates is considered. It is assumed that the pore sizes or the including sizes are small compared with the distance at which the kinematic and geometrical characteristics of the motion change significantly. Generally, the mathematical models in the theory of wave propagation are continuous, linear and smooth. Natural media are generally rough and discontinuous. It is possible to determine the fractal dimension, which characterizes in fact the irregularity of the real media. It is known that the fractal dimension exceeds the Euclidean dimensions.

A wave in an inhomogeneous medium is understood as an isolated surface, which the stresses and rates of displacement are discontinuous. The Fermat's principle allows to construct ray trajectories, the principle of Huygens allows to construct wave fronts. An acoustical energy in continuous media in accordance with Fermat's principle and principle of Huygens propagates along ray tubes and locates at a surface front of the wave.

In the paper the modification of the Fermat's principle for wave propagation in the media with fractal structure is considered.

In this case the differential equations for the ray trajectories have the order which is equal to the dimension of the medium. Mathematical simulation of the deterministic chaos for the behavior of the energy flux lines in the frame of nonlinear dynamics of rays in the inhomogeneous medium is considered.