

ABOUT THE KINETIC MODELS OF CONTROLLED PRODUCTION PROCESSES

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Build of PDE- models using kinetic theory contains a hierarchical set of equations. This allows you to go beyond the limits of applicability of the quasistatic models [1,2,3,4]. The proposal method by Bogolyubov [2], based on the selection of a small parameter, allows you to trim the number of equations at the right level. With the using of the kinetic equations for the first moments of the distribution function of the objects of labour $f(x, v, t)$ (Armbruster D., Ringhofer C.) [1,2,3] balance equations were written down:

$$\frac{\partial \rho(t, x)}{\partial t} + \frac{\partial \rho(t, x) \cdot v(t, x)}{\partial x} = 0, \quad \frac{\partial v(t, x)}{\partial t} + v(t, x) \cdot \frac{\partial v(t, x)}{\partial x} = 0, \quad (1)$$

$$\rho(t, 0) \cdot v(t, 0) = \lambda(t), \quad v(t, 1) = \frac{\mu}{1 + W(t)} \quad (2)$$

$$\frac{dv(t, 0)}{dt} = -\sigma \left(v(t, 0) - \frac{\mu}{1 + W(t)} \right), \quad \text{when } \lambda < \mu, \quad v(t, 0) = \frac{\mu}{0,5 + W(t)}, \quad \text{when } \lambda \geq \mu. \quad (3)$$

with boundary conditions (2), where σ -experimental quantity. The report provides a detailed analysis of the balance equations (1)-(3).

References:

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