

ON NONCLASSICAL ONE-DIMENSIONAL MODELS FOR THERMOELASTIC BARS

Gia Avalishvili*, Mariam Avalishvili**

*Faculty of Exact and Natural Sciences, I. Javakhishvili Tbilisi State University
Tbilisi, Georgia, gavalish@yahoo.com

**University of Georgia, Tbilisi, Georgia, mavalish@yahoo.com

In the present paper Green-Lindsay dynamical three-dimensional model [1] of the nonclassical theory of thermoelasticity is considered for a bar with variable rectangular cross-sections the thickness and width of which may vanish at one of the ends of a bar. The butt end of a bar with positive area is clamped and temperature vanishes on it, and along the remaining part of the boundary of a bar the surface force and along the normal the component of heat flux is given. Applying variational approach the three-dimensional model is reduced to a hierarchy of one-dimensional ones. The initial-boundary value problems corresponding to the obtained one-dimensional models are investigated in suitable function spaces. Moreover, the convergence of the sequence of vector-functions of three space variables restored from the solutions of the reduced one-dimensional problems to the solution of the original three-dimensional problem is proved and under additional conditions the rate of convergence is estimated.

References

1. Green, A.E.: Lindsay, K.A.: Thermoelasticity. *Journal of Elasticity*, **2** (1972), 1, 1-7.