

Waves in Thermoelastic and Plastic Solids

Revising Old Problems by New Solutions

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ABSTRACT

The Bulgarian 2nd National Congress of Theoretical and Applied Mechanics took place in 1973. The program had contained several dynamical problems. Let us recall two of them dealing with the shock waves in thermoelastic solids [1] and with the constitutive equation of the dynamic, plastic tension [2]. The reason of this choice is very simple. From this event on, a fruitful cooperation between Tallinn and Budapest started.

Recalling the papers one can see that the problems are still vivid even several dozen of papers have dealt with the tasks meanwhile, the results have been used in different fields of natural sciences and in engineering. The basic difference is not in the purpose, but in the methods used to obtain the solutions.

In this paper our goal is to analyse the new technics, e.g. the numerical calculations, mainly the FEM and the possibility of the electrical analogy (EA) emphasizing the difference between them.

No doubt, wadays the role and importance of FEM and other numerical methods is clear. The benefit of the EA is far not as trivial, even though there are several applications, e.g. [3].

In our paper we deal with the advantages given by the EA. By a comparison between EA and FEM we try to separate the really useful and less useful parts of the EA. Finally, we attempt to generalize the problem concerning the proper attitude towards the old and the new methods.

REFERENCES

- [1] J. Engelbrecht. Creation of shock waves in thermoelastic solids. *2nd National Congress of Theoretical and Applied Mechanics* (2nd NCTAM), Varna, 8-14 Oct, 1973, Bulgaria.
- [2] G. Beda, A. Szekeres. Analysis of a possible constitutive equation of the dynamic plastic tension. *2nd National Congress of Theoretical and Applied Mechanics* (2nd NCTAM), Varna, 8-14 Oct, 1973, Bulgaria.
- [3] A. Szekeres. Coupled fields and electrical analogies in mechanics. 25th Midwestern Mechanics Conference. Sept 21-24, 1997, South Dakota School of Mining and Technology, Rapid City, SD (presentation).