EUROMECH

EUROPEAN MECHANICS SOCIETY

Final Report

Date: 11. 11. 96

Please send this report to the Secretary-General of EUROMECH, Professor Bengt Lundberg, School of Engineering, Uppsala University, Box 534, S-751 21 Uppsala, Sweden, within one month after the Colloquium.

General

EUROMECH Colloquium No: **356**   Dates: **October 3 - 5, 1996**

Title: **Transform methods in solid mechanics**

Co-Chairman:

Place and country: **Kloster Seeon, Seeon, Germany**

Is there need of another colloquium on the same subject? Which year?   **No**

Finance

Conference fee: **300,-**   The fee included: **meals, excursion costs, organization cost and printing**

Funding: **DFG for 9 participants from Eastern Europe**

Accomodation (type and cost): **2 groups:**

Meals: **DM 25,- lunch or dinner** | **DM 195,- per night including full boarding (Kloster Seeon)**
| **DM 70,- per night excluding lunch and dinner (Obervint)**

Participation

Number of participants from each country:

Country		Country		Country	
Austria	___	Germany	9	Rumania	___
Belgium	1	Great Britain	1	Russia	4
Bielorussia	___	Greece	1	Slovakia	1
Bosnia	___	Hungary	___	Slovenia	___
Bulgaria	___	Ireland	___	Spain	1
Croatia	___	Italy	1	Sweden	2
Czech Republic	___	Latvia	1	Switzerland	3
Denmark	___	Lithuania	___	Ukraine	2
Estonia	___	Netherlands	1	Yugoslavia	___
Finland	___	Norway	___	Others	___
France	1	Poland	1		
Georgia	___	Portugal	___	Total	30

Please turn

Scientific Report
EUROMECH Colloquium 356
Transform Methods in Solid Mechanics
Munich, 3. - 5. October 1996

Integral transform methods can be applied in various fields of solid mechanics. The recent developments in scientific research have deeply influenced the field of their applications. On the one hand side the advanced computerization enables numeric solutions (e.g. Finite or Boundary Elements) of complex problems. Some of them demand particular treatment or special solutions in the frame of transform methods. On the other hand the progress in analysis, especially the functional analysis initiated by the mathematicians in the 1950s and 1960s, has enlarged significantly the realm of transform methods.

Until the political changes in 1989 the research in mechanics of Eastern and Western Europe has developed very differently particularly in the field between mathematics and mechanics. The achievements in numerical modelization of mechanical problems in the West and the methods of the East more oriented towards analytical respresentations have lacked a fruitful interchange. One of the main ideas for this EUROMECH colloquium was to enable this exchange which was finally realized by the group, although it rests still a challenge for the future. The additional language barrier rather severe directly after 1989 vanishes more and more.

Due to the intense programme, the extended discussions over the whole three days, the social events and not at least the marvellous surroundings and historic sight of the monastery *Kloster Seeon*, for all participants the exchange of ideas and experiences was very specific, helpful and personal. Several international contacts have been initialized and may last in the future. The heterogeneity of the group has turned out as an advantage. In the beginning it was difficult to match all the different features and mathematical points of view, but the group succeeded to mediate the particular aspects and may have obtained a large number of new ideas for the future research.

On the numerical side the frame of the discussion reached from the generalization of variational principles for viscoelastic media to questions concerning Boundary Elements applied to transient problems. New designed transforms for special identification problems as well as several applications of wavelets (e.g. identification, mixed boundary value problems) were presented. They are adequate for achieving better convergence or for higher compactness of data representations. One of the main results of the discussions concerns the possible combination of these different methods, e.g. to use the ability of data concentration of the wavelets for numeric procedures demanding high computational effort like the Boundary Element Method.

The aspects of these papers were completed by papers treating the analytic applications of integral transforms, e.g. the extension of the transformability due to functional