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# Boundary Elements and other Mesh Reduction Methods XXXII

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# Preface

Looking back to 1978 when the first of these conferences took place, it is rewarding to see how much the Boundary Element Method has developed in the last three decades (or – to be precise – 33 years if one dates its beginning from when the first paper on BEM was published\*).

What is also remarkable is that the Method originated a whole series of “derivatives” – if I can use that word – dealing with mesh reduction techniques. It was indeed the quest for mesh reduction that was the motivation for the development of the BEM. The fact that the Method was based on boundary integral equations was driven by engineering needs rather than by their mathematical beauty and elegance.

Given the continuous emergence of new techniques, it is important nowadays to bear those concepts in mind, focusing on the user’s needs rather than the interests of the developers. For any new mesh reduction method to be truly successful, it must perform well in engineering terms. Analysis techniques which are not reliable and robust are bound to fail, regardless of their higher accuracy and excellent performance in an academic environment.

Another important quality that any new computational technique needs to offer to industrial users is ease of application. Nowadays, this involves good interfacing with existing modelling systems as well as the need to be independent of the setting up of parameters or coefficients which, for all their mathematical importance, are meaningless to the user.

It is now a good time to start looking at the new generation of analytical tools based on the substantial amount of work carried out in the last few years. New ideas seem to develop within a “generation” period. This seems to be the case if

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\*Brebbia, C.A. and Dominguez, J. “The boundary element method for potential problems” *Appl. Math. Modelling*, **1**, 372–8 (1977).

we look back at the first papers on FEM (1955) and BEM (1977). The Proceedings of this series of Conferences, which encourages the presentation of novel ideas, may hold the key to the future of engineering analysis, particularly the volumes published in the last 10 years or so.

We leave to the new generation the task of unravelling the future.

Carlos A. Brebbia  
The New Forest 2010

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