Forward

Commemorative Issue for Frank Rizzo

This is the first of two special issues of the Electronic Journal of Boundary Elements dedicated to Frank Rizzo. To say that Frank Rizzo played an important role in the development of what he referred to as "boundary integral equations" would not give much credit to where much credit is due. While it could be argued that the use of integral equations to formulate and form a computational basis of many of the problems of applied mathematics and engineering would probably have been inevitably developed, it was Frank's seminal work on using the integral equation approach to classical elastostatics that set a whole new research area into motion. His dissertation (which we thought would be of interest to include in this issue) topic, as suggested by his mentor Marvin Stippes at the University of Illinois, and subsequently so well documented in the oft-cited paper "An Integral Equation Approach to Boundary Value Problems of Classical Elastostatics", Quarterly of Applied Mechanics, 1967, represented the quantum step in the use of integral equations for classical scalar potential problems to the vector potential problems of practical engineering significance.

The theoretical basis for this development was Betti's reciprocal work theorem with the fundamental (response to a point force) solution of the equations of elastostatics, but it was Frank Rizzo who actually breathed the new life into this classical mathematics. A nontrivial contribution of Frank's original work was to not only to achieve the singular integral equation formulation, but also the systematic methodology of reducing the elegant integral equation formulation to well conditioned, linear algebraic equations by proper analytical integration of the singular terms. Those combined theoretical and practical developments by Frank set into motion a whole new and modern approach to numerically solving partial differential equations, at least of the elliptic type. With Frank's hard work and the recognition of its elegance and potential by several of his early disciples, the integral equation method blossomed into a powerful and practical computational methodology that would eventually be called "boundary elements".

Amongst the early disciples of the integral equation method, several of which contributed significantly to advancing the methodology to a sophisticated and now mature state, are the authors of this issue and its sequel dedicated to Frank. It is undoubtedly fair to say that most of these authors were, at one time or even continuously, colleagues and personal friends of Frank Rizzo. Frank's contributions to the boundary integral equation method spanned nearly four decades, from roughly 1964 to 2001. I, too, have been very privileged to become involved with this field in the 1970's and later to work side by side with Frank, especially in that part of the development of the methodology for what is now referred to as "hypersingular" integral equations. I'm sure that all the present authors can recall numerous occasions and conversations with Frank on a technical point or issue regarding the application of "his" boundary integral method to their own problem of interest. Throughout his productive career, his easy going, collegial, engaging, yet

rigorous style earned him respect and admiration that surely befits the "father" of modern boundary integral methods. This commemorative sequence of two issues represents only a small token of tribute and recognition that Frank Rizzo so much deserves for his "singular" contributions to the field that he virtually invented, developed, promoted and nurtured to maturity.

Thomas J. Rudolphi
Iowa State University