



## **Hendrik W. Hoogstraten and the Journal of Engineering Mathematics**

This issue is dedicated to Hendrik W. Hoogstraten on the occasion of his retirement from active science. He was the Managing Editor of this journal from 1975 to 1990, having acted as the secretary of the Editorial Board as from its inception in 1967.

The Journal of Engineering Mathematics owes its existence to the foresight of the late Reinier Timman who passed away in 1975. Timman was an applied mathematician quite unlike his predecessors and colleagues at the Technical University of Delft in The Netherlands, where he taught in the Department of Mathematics. As can be said of many similar departments, its main task was to teach mathematics to undergraduates of other departments, such as the Physics, Electrical Engineering and Mechanical Engineering Departments. Within the Mathematics Department the emphasis was on techniques and methods and much less on mathematical modelling.

Timman, having been active in the aircraft industry and aerodynamics-related research prior to his appointment in Delft, realized that a new kind of mathematician ought to be trained, using mathematics as a tool to increase our understanding of problems arising outside mathematics, as in engineering. The mathematical tool-kit of these mathematicians should be more richly endowed than that of those graduating from other engineering departments. But, to be able to put that tool-kit to practical use, this new breed of mathematicians should also have a thorough knowledge of the physics and engineering concepts taught outside the mathematics department. Thus, in the spirit of Timman's ideals, the Department of Mathematics at Delft started awarding degrees of Engineering Mathematics in the 1950s. This may well have been one of the earliest usages of this term anywhere in the world.

In Timman's view, a mathematical engineer can be usefully employed in industry by raising the level at which mathematical modelling is carried out there. Having a larger array of techniques at his/her disposal, this specialist will be able to develop more-powerful simulation tools, thus providing deeper insight into the underlying engineering phenomena. Such mathematicians should always be guided by the physics that lies behind the equations they study. In other words, he/she does not consider equations as entities of a purely mathematical nature. A lot of intuition goes into the process of finding methods of solution.

The above led to another of Timman's ambitions, namely the creation of a journal devoted to engineering mathematics. To bring this about, he assembled a group of like-minded people, all but one from The Netherlands, in whom he inspired the kind of enthusiasm that he himself had for this project. They approached the publisher P. Noordhoff<sup>1</sup> in the city of Groningen. Before WWII, Noordhoff had been the publisher of a series of beautiful mathematics texts in the Dutch language. Later they became known internationally by their English translations of Russian textbooks and monographs written by such famous authors as Muskhelishvili, Kantorovich and Krylov, and others.

Initially, the ambitions of this group of about ten co-opted editors were quite modest. Although the journal was published in the English language, the idea was that it should become an outlet for applied and engineering mathematicians active in The Netherlands. As happens so often with newly founded journals, the first batch of papers were obtained through

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<sup>1</sup> Meanwhile a series of mergers and take-overs have occurred in the Dutch world of science publishing. As a result, the journal is now published by Kluwer Academic Publishers.

soliciting among the founders' own sphere of influence. However, it soon turned out that a larger share of the papers were submitted from abroad. No doubt, the Publisher had taken its task of publicizing the journal quite seriously and thus it rapidly grew beyond its originally intended regional bounds.

Hendrik Hoogstraten – a student of Timman's, as is the present Editor-in-Chief – to whom this issue is dedicated, has had a strong hand in making the Journal of Engineering Mathematics the international journal into which it has grown. In retrospect, it was rather naive to think that a journal of this kind could thrive on a narrow regional base. Admittedly, if all of the best authors in The Netherlands at the time had submitted their work to JEM then, subject to a strict refereeing policy, a good-quality journal could have been maintained. However, whereas in the past great names such as Lorentz, Korteweg and de Vries were happy to publish locally and often in their native language<sup>2</sup>, modern Dutchmen show less confidence in home-grown journals and look abroad for recognition. And thus, the only way to attain a sustainable position for itself was for the journal to become international.

Hoogstraten, when taking the reins in 1975, realized this to the full and proceeded by making the Editorial Board more international. Whereas in 1967 ten out of the eleven Board Members were of Dutch origin, the number of Dutchmen had shrunk to seven in 1977 and four editors had been appointed from other countries. The imbalance was further redressed and in 1987 the ratio was eight to seven in favour of colleagues from outside The Netherlands. Now the ratio is nineteen to six.

Another strong measure of Hoogstraten's was to limit the journal's scope. He felt that the journal should concentrate, roughly speaking, on fluid and solid mechanics. In the early days JEM had also featured papers on graph theory, optimization, probability and systems theory. Hoogstraten rightly thought that a quarterly journal of less than 400 pages per annum could not afford to have too wide a scope. This led to people serving those disciplines leaving the Editorial Board and being substituted by colleagues from abroad who were active in the journal's key disciplines.

In recent years the journal has expanded to a hefty 1200 pages per annum and is truly operating on an international scale. We do not have any regional allegiances. Although the language of expression is English, we do not enforce a specific usage, for instance, American or British English. Indeed, an author's knowledge of English, or rather lack of it, should not be a reason for rejecting an otherwise good paper. There have been instances – luckily only very few in number – where an author was asked to write his paper also in his native tongue, whereupon a specialist was hired to brush up the English version.

The word *Engineering* that appears in the title of this journal may occasionally be a source of misunderstanding. Some authors, referees and others have strong visions of heavy equipment, cog wheels dripping with oil and all kinds of machinery in association with this concept. Authors thinking along those lines may be inclined to submit papers that are lean on sophisticated mathematics, but are undeniably in the engineering mould. It is then upon the Editors to explain to them that such papers should be submitted elsewhere. On the other hand, some referees may deem a paper unsuitable, feeling that it has no engineering content, although the mathematics is good, lies within our Aims and Scope, and a problem arising outside mathematics is considered. When our scientific standards are met, applied-mathematics papers of that kind are always welcome.

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<sup>2</sup> James Clerk Maxwell is said to have taught himself to read Dutch, so that he might be able to study H.A. Lorentz's seminal early work in the original.

The sort of paper that we like to publish most has not changed much since Hoogstraten defined this years ago. We still have a preference for papers which address a problem or problems arising outside mathematics, as in engineering and mechanics, and develop sophisticated mathematical models and bring to bear non-trivial mathematical techniques to shed some light on these problems. Preferably, these papers should offer intellectual enjoyment to our readers. Whereas we are not averse to formal mathematics, that is, for as long as it serves in the understanding of the underlying non-mathematical question put at the outset, most of the mathematical arguments we publish are intuitive, based as they are on physical reasoning and some measure of trial and error. The ideal paper involves a nonlinear model which, in its non-dimensional form, features only a small number of parameters and is amenable to asymptotic treatment. This ideal paper also has a numerical section in which graphs and figures that illustrate the solution are presented. Comparison of the theoretical results with experiments will make the paper even more interesting. For the benefit of those who wish to put the results to practical use, our papers are embedded in a mainly verbal introduction and a concluding-remarks section which, together, put it in a practical context. This serves to define the centre of gravity of this journal's playing field. Around it there is a wider spectrum of papers that may be quite suitable, as long as these contain some of the ingredients described above.

Hendrik Hoogstraten pursued these ideals in JEM's earlier days. We are grateful to him for his vision and for having defined a clear niche for the Journal of Engineering Mathematics among its many high-quality sister journals. We all serve the discipline of applied mathematics in all its multifarious forms and shapes. We know it for the intellectual enjoyment it may give, but also for its (potentially) great practical use for society as a whole. These days mathematics in its entirety seems to be losing some of the attraction it used to have for the younger generations, at least in the Western World. This year, in The Netherlands, a country with sixteen million inhabitants, only one hundred young people have entered university as first-year undergraduate mathematics students, down from the far higher levels of only twenty or even ten years ago. It is said that many other Western-European countries suffer a similar dramatic decline in the interest in mathematics among the indigenous younger generations. In Britain the situation is still fairly encouraging, but there also the numbers are decreasing and words of caution are being uttered. Traditionally, the USA has always depended strongly on newly arrived immigrant talent and has thus been able to maintain a good standard. Another often-heard complaint is that students, when entering university, seem to know less about mathematics than, say, three decades ago.

Let us hope that this waning interest in mathematics, as it manifests itself in the West, is a transient phenomenon. Only through ever more sophisticated mathematical modelling can we hope to tackle the multitude of technical, environmental, biological, economical, societal, etc. problems that a modern world such as ours poses. Luckily in China mathematics has been recognized as an important discipline. The exploits of their youngsters at the International Mathematics Olympiad are truly amazing. Perhaps it is up to these emerging economies to rise to the challenge and continue developing our field when large parts of the Western World now seem to be taking a dim view of mathematics. They will be richly rewarded and, with proper management, these societies may reach new levels of power and prosperity.

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Editor-in-Chief

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