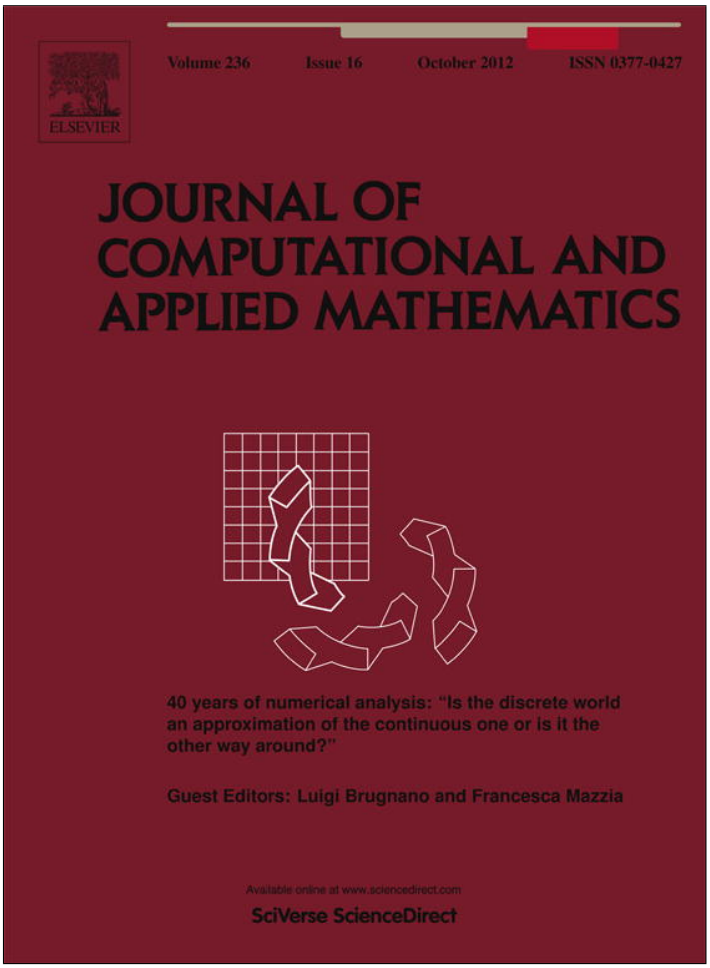

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Preface

40 years of numerical analysis: "Is the discrete world an approximation of the continuous one or is it the other way around?"

This special issue is devoted to the memory of Professor Donato Trigiante, one of the leading Italian numerical analysts, who passed away on September 2011.

His scientific activity in the field lasted about 40 years, which accounts for the first part of the title of this special issue. The second part will be explained later, after a brief history of his life.

Donato Trigiante was born in Laterza (a small town in the south of Italy) on March 31, 1944. Of humble origins, he was a "self-made man": thanks to a grant, he had the opportunity to study at the University of Turin where he got a degree in physics, in 1967, and a further degree in mathematics, in 1970. At the same time he attended an advanced course in theoretical physics, in Rome. His first scientific interests were actually in this field. Then, he arrived at IBM, in the fall of 1971. He joined the IBM Research Centers in Bari, Rome, and Yorktown Heights, remaining with them until 1980. In this period he discovered numerical analysis, also taking up temporary positions at the Universities of Bari and Bologna.

From the United States, he applied for a professorship at the university and, in 1980, he obtained a position at the University of Bari. He remained there until 1991, then moving to the University of Florence. He retired in 2011, a few months before he passed away, because of a cancer, on September 18, 2011.

When he was a student in Turin, he met his wife Valeria. Everyone who has known Donato can testify that they were a very close couple, with very different and complementary natures: one a bright scientist, the other a humanist and a fine painter. None of us has remembrances of either one of the two without the other one. Valeria has lovingly (and heroically) assisted Donato until his very end, just surviving him by a few months, being herself affected by the same illness. They now rest together at the Monumental Cemetery in Turin, the same city where they first met more than 45 years before. Also here we would like to remember both of them together, as in the picture. They are survived by their sons Giuseppe and Mario.

Most of his former students met Donato in the period spent at the University of Bari. All of us remember his authoritativeness and correctness, as well as his generosity and absolute moral integrity. But the most striking features were his enthusiasm and the love for the research activity. It is then not by chance that he created a scientific school: indeed, all of the previously listed features constituted a powerful mixture which encouraged his students to collaborate with him. Among his former students, we list: L. Aceto, P. Amodio, D. Bertaccini, L. Brugnano, V. Casulli, F. Iavernaro, N. Mastronardi, A. Mazzia, F. Mazzia, I. Sgura, T. Politi.

His clear mind was always set on searching for his own explanation of things: necessarily essential and, often, unconventional. Since the period spent at IBM, he realized that stability issues were central in numerical analysis and, because of this, he attended specific courses on this subject, delivered by V. Lakshmikantham and L. Salvadori. With Lakshmikantham he started a collaboration which continued for the rest of his life. This background on stability allowed him very soon to start studying numerical methods within the framework of dynamical systems[1]: i.e., discrete dynamical systems, sometimes approximating continuous ones. And here comes the second part of the title. Indeed, since discrete dynamical systems are much richer (from the dynamical point of view) than continuous ones,[2] Donato was a convinced supporter of the idea that actually continuous models were approximations to discrete laws, rather than the other way around.

[1] As is well known, this has become very popular in numerical analysis.

[2] It is enough to compare the logistic discrete and continuous equations to realize this.

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Donato Trigiante (1944–2011) and his wife Valeria (1945–2011).

Together with Lakshmikantham, in 1988 he coauthored the book *Theory of Difference Equations: Numerical Methods and Applications* (a second edition would follow in 2002), one of the most important in that field. Through difference equations, he moved on to numerical linear algebra and, from there, to numerical methods for differential equations, where he introduced the class of boundary value methods. The 1998 monograph *Solving Differential Problems by Initial and Boundary Value Methods* was devoted to this topic. His scientific production amounts to more than a hundred papers and seven books. His interests, however, were much wider: history of mathematics, economics, number theory, to mention but a few. He never gave up his interests, even in the terminal phase of the illness, during which he always maintained his stoic imperturbability, though clearly conscious of his condition. He would have still had a lot to give, both as a scientist and as a man. He will always continue to live in our thoughts.

We would like to thank all contributors to this special issue—many of them were Donato's good friends, who warmly accepted our invitations—as well as Elsevier, for hosting this special issue of the *Journal of Computational and Applied Mathematics* to commemorate his life.

Ad maiora, Donato.

Luigi Brugnano *
Francesca Mazzia
E-mail address: luigi.brugnano@unifi.it (L. Brugnano).

* Corresponding editor.