



Marco Donatelli

 UNIVERSITY OF INSUBRIA



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Contact data

Assistant Professor

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Biography

-July 2002: B.S. in Computer Science, summa cum laude at the University of Florence.

- October 2002 – January 2003: research contract with the Department of Computer Science at the University of Pisa, for the project “Sviluppo e testing di un codice Multigrid per la soluzione dei sistemi lineari strutturati all'interno di un codice Interior Point per la soluzione di Problemi di Flusso di Costo Minimo”.

- November 2002 – present: Ph.D. student in “Matematica e Statistica per le Scienze Computazionale” at the University of Milan.

- November – December 2003: teaching contract for the course “Elementi di programmazione in Fortran per il Calcolo Scientifico” at the University of Insubria - School of Sciences in Como.

-April-May 2004: teaching contract for the course “Il software Matlab nelle scienze applicate” at the University of Insubria - School of Sciences in Como.

- October 2005 – present: Researcher in Numerical Analysis at the University of Insubria- School of Sciences in Como

Qualifications and awards

-July 2002: B.S. in Computer Science, summa cum laude at the University of Florence.

- November 2002 – present: Ph.D. student in “Matematica e Statistica per le Scienze Computazionale” at the University of Milan.

- October 2005– present: Researcher in Numerical Analysis at the University of Insubria - School of Sciences in Como.

Research interests

Multigrid methods for linear systems arising from various applications, with a special interest in restoration of blurred and noisy images. I am interested in convergence results and new projection strategies for algebraic multigrid methods for linear systems with coefficient matrix generated by a symbol like multilevel Toeplitz or matrix algebra structures (see [2, 7]).

A further and related field of research is the restoration of blurred and noisy images, especially the dealing with edge effects and regularization methods. Concerning the edge effects, it is of great interest to improve the approximation at the border of the image reducing the ringing effects. I am investigating new boundary conditions and correlated techniques advantageous both from an approximation and computational point of view (see [1, 4, 6, 8]).

Concerning the regularization methods is considered the algebraic multigrid methods defined for matrices generated by a symbol. Those methods can be used in connection with the Tikhonov regularization (see [3]) or can be specialized to define a multigrid iterative regularization method (see [5]).

Teaching experience and appointments

2003 – 2004: contract teacher for courses in Scientific Computation (Fortran and Matlab) at the University of Insubria, School of Sciences in Como.

Autumn 2005: Numerical Analysis II - degree course in Mathematics, University of Insubria, School of Sciences in Como.

Representative publications

1. M. Donatelli and S. Serra Capizzano, "Anti-reflective boundary conditions and re-blurring", *Inverse Problems*, 21 (2005), pp. 169-182.
2. A. Aricò, M. Donatelli and S. Serra Capizzano, "V-cycle optimal convergence for certain (multilevel) structured linear systems", *SIAM J. Matrix Anal. Appl.*, 26-1 (2004), pp. 186-214.
3. M. Donatelli, "A Multigrid for image deblurring with Tikhonov regularization", *Numer. Linear Algebra Appl.*, 12 (2005), pp. 715-729.
4. R. Vio, J. Bardsley, M. Donatelli and W. Wamsteker, "Dealing with edge effects in least-squares image deconvolution problems", *Astron. Astrophys.*, 442 (2005), pp. 397-403.
5. M. Donatelli and S. Serra Capizzano, "On the regularizing power of multigrid-type algorithms", *SIAM J. Sci. Comput.*, in press.
6. M. Donatelli, C. Estatico and S. Serra Capizzano, "Boundary conditions and multiple-image re-blurring: the LBT case", *J. Comput. Appl. Math.*, in press.
7. A. Aricò and M. Donatelli, "A V-cycle Multigrid for multilevel matrix algebras: proof of optimality (and applications)", *Numer. Math.*, to appear.
8. M. Donatelli, C. Estatico, J. Nagy, L. Perrone e S. Serra-Capizzano, "Anti-reflective boundary conditions and fast 2D deblurring models", *Proceedings SPIE, Advanced Signal Processing Algorithms, Architectures and Implementations XIII*, San Diego, CA, 5205 (2003) pp. 380-389.