Universita' degli Studi di PADOVA
Ricerca Scientifica DOR

Anno: 2016 - prot. DOR1695473

1.0 Dipartimento del Responsabile Scientifico del Programma di Ricerca

Dip. MATEMATICA "TULLIO LEVI CIVITA" - DM

1.1 Area Scientifico Disciplinaredel Programma di Ricerca

Area Scientifico Disciplinare	*01 - Scienze Matematiche*	*(% di afferenza)*	*80*
Area Scientifico Disciplinare	*07 - Scienze Mediche*	*(% di afferenza)*	*20*

1.2 Responsabile Scientifico del programma di Ricerca

DE MARCHI	*Stefano*	
(cognome)	(nome)	
Professore Associato confermato	*MAT/08*	*17/12/1962*
(qualifica)	(settore scient.discipl.)	(data nascita)
DMRSFN62T17B589H		*DIP. MATEMATICA "TULLIO LEVI CIVITA" - DM*
(codice di identificazione personale)		(Dipartimento)
+39 0498271425	*+39 0498271499*	*demarchi@math.unipd.it*
(prefisso e telefono)	(numero fax)	(indirizzo posta elettronica)

1.3 Settori scientifico-disciplinari interessati dal Programma di Ricerca

MAT/08 *MED/36*

1.4 Curriculum scientifico del Responsabile Scientifico del programma di ricerca

Data e luogo di nascita: 17.12.1962, Candiana (Pd)

1987: Laurea in Matematica – Università di Padova
1994: Dottorato in Matematica Computazionale e Informatica, VI ciclo – Consorzio NE, Padova
1995-2005: ricercatore universitario SSD MAT/08
2005-oggi: professore associato SSD MAT/08

Attivita' editoriale e di referaggio
- Editor in chief of: Dolomites Research Notes on Approximation (DRNA) (http://journals.padovauniversitypress.it/dolomites/)
- Editorial board of Journal of Pure and Applied Mathematics: Advances and Applications (http://scienticadvances.co.in/index.php?cmd=journal&j=5)

- Editorial board of The Scienti c World Journal, mathematical analysis (http://www.hindawi.com/journals/tswj/editors/mathematical.analysis/)

- E' stato ed e' referee per: Siam Journal of Matrix Analysis and Applications, Journal of Approximation Theory, Advances in Computational Mathematics, Journal of Computational and Applied Mathematics, Numerical Algorithms, Proceedings A Royal Mathematical Society, Mediterranean Journal of Mathematics, International Mathematical Journal, Methods and Applications of Analysis, The Scientific World Jounal, AMS Mathematical Reviews

- Reviewer di progetti per: FCT del Portogallo, FWO (Flemish Research Institute) e SIR 2014.

Supervisione di tesi
- Relatore di 20 tesi di laurea (6 triennale e 15 magistrale) in Matematica e 1 di dottorato in Matematica Computazionale. Relatore anche di tesi di laurea v.o. in informatica. E' stato anche relatore di una tesi di Master.

Visite per scambi di ricerca
- Professore Visitatore presso diverse Università europee e nord-americane e recenti visite presso le Università di Goettingen, Amburgo, Oslo, Antwerp, Varsavia, Valparaiso.

- Responsabile del Programma Erasmus con le Università di Amburgo, Goettingen, Anversa e Varsavia.

Comunicazioni a convegni
- Ha presentato 54 comunicazioni scientifiche (anche come plenary speaker ed invited session speaker) in conferenze internazionali.

Pubblicazioni
- Autore di oltre 95 lavori scientifici: 63 articoli su rivista, 14 su proceedings, guest-editor di 6 proceedings, 4 monografie (2 didattiche e 2 scientifiche).

- Ha pubblicato software scientifico su ACM Transaction on Mathematical Software e Netlib.

Bibliometria
- MathSciNet: 57 publications, 227 citations
- Google Schoolar: 895 citations, h-index=16
- Scopus: 49 publications, 347 citations, h-index=11
- ResearchGate: 90 publications, 589 citations, impact points=57.08
- MR Erd os Number=3.

Vedasi anche http://www.math.unipd.it/~demarchi/mioCVEnglish.pdf

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2 Programma di Ricerca

2.0 Titolo del Programma di Ricerca

Approximation by radial basis functions and polynomials: applications to CT, MPI and PDEs on manifolds

2.1 Parole chiave

1. *AREA 01 - MSC - Approximations And Expansions - INTERPOLATION*
2. *AREA 01 - MSC - Numerical Analysis - Numerical Approximation And Computational Geometry (Primarily Algorithms) - INTERPOLATION*
3. *AREA 07 - MED - Med/36 - Diagnostic Imaging And Radiotherapy - NUCLEAR MAGNETIC RESONANCE*
4.

2.2 Descrizione del programma di ricerca

The research program can be roughly separated in three main parts, related to the proposed approximation models: radial basis functions, multivariate polynomials applications, PDEs on manifolds with applications to shallow water and Digital Terrain Models

1. RBF applications.

In the setting of Radial Basis Function (RBF) approximation, some efforts has been made to construct bases which allow to better compute the approximant, both from the point of view of convergence and of stability. We have recently proposed the so called weighted SVD basis [13]. We then have povided a faster way to compute this basis using methods based on Krylov subspaces [1]. The new introduced method that computes a new approximated WSVD basis has shown to be very effective both from the point of view of the computational time and the approximation feautures. On the other hand, thanks to the fact that the new basis is built using also information coming from the sampling of the

unknown function, we are now able to obtain a better approximation. The approximant is very general, independent of the special kernel used.
Some features of the basis need further investigations. In particular, the stopping rule we used in the numerical experiments seems to be too rough, and needs to be improved.
Hence, considering also the state of the art, we propose a new method for multivariate approximation which allows to interpolate large scattered data sets stably, accurately and with a relatively low computational cost.
The interpolant we are considering is expressed as a linear combination of some basis or kernel functions.

Focusing on Radial Basis Functions (RBFs), the partition of unity method is usually applied by blending local RBF interpolants and using compactly supported weight functions. Here, instead, for each partition of unity subdomain a stable RBF basis is computed in order to solve the local interpolation problem. Consequently, since the local approximation order is preserved for the global fit, the interpolant will result more stable and accurate. Moreover, in terms of accuracy, the benefits coming from the use of such stable bases are more significant in a local approach than in a global one. In fact, generally, while in the global case a large number of truncated terms of the SVD must be dropped to preserve stability, a local partition of unity technique requires only few terms are eliminated, thus enabling the method to be much more accurate.

Concerning the computational complexity of the algorithm, the use of the so-called kd-tree space partitioning data structure, which successfully works in any space dimension, enables us to efficiently organize points among the different subdomains (cf. Cavoretto 2014). Then, for each subdomain a local RBF problem is solved with the use of a stable basis. The main and truly high cost, involved in this step, is the computation of the SVD. To avoid this drawback, techniques based on Krylov space methods are employed, since they turn out to be really effective (cf. De Marchi and Santin, BIT 2014}). A complexity analysis supports our findings. Extensive numerical tests carried out with RBFs of different orders of smoothness, both globally and compactly supported, show the performance of the method on various data sets.

The application to medical image reconstruction from Radon data has been carried out in a recently submitted paper (see reference nr. 3 in the list of publications of the research group). The method, starting for scattered Radon data, combines kernel-based scattered data approximation with a well-adapted regularization of the Radon transform. It then results in a very flexible numerical algorithm for image reconstruction, which works for arbitrary
distributions of Radon lines. This is in contrast to the classical filtered back projection, which essentially
relies on a regular distribution of the Radon lines, e.g. parallel beam geometry. The good performance of the kernel-based image reconstruction method has been illustrated by numerical examples. One "obvious" improvement is to develop and adaptive procedure for selecting the lines on which interpolate. This can be done by using the Newton bases (Müller, Stefan; Schaback, Robert: A Newton basis for kernel spaces. J. Approx. Theory 161 (2009)(2), 645–655).

2. Lissajous curves and application to MPI.

Lissajous curves are parametric (closed and not closed) fill-in curves
that can be defined on the d-cube. The interest for us is that these curves in the d-cube, generate algebraic cubature formulas on a special family of rank-1 Chebyshev lattices. These formulas are used to construct hyperinterpolation polynomials via a single 1-dimensional Fast Chebyshev Transform (computed by the Chebfun package). In the case $d=2,3$ we are able to compute discrete extremal sets of Fekete and Leja type for polynomial interpolation as well (cf.Len Bos, Stefano De Marchi, Marco Vianello: Trivariate polynomial approximation on Lissajous curves, http://arxiv.org/abs/1502.04114). Extension to the (d>3)-dimensional cube have been done in L. Bos, S. De Marchi and M. Vianello: Polynomial approximation on Lissajous curves in the d-cube (proceeding conference honoring prof. F. Costabile, submitted 2015). Applications arise in the framework of Lissajous sampling and filtering to avoid the Gibbs phenomenon in MPI (Magnetic Particle Imaging) image reconstruction.

These 2 parts of the project will be done in collaboration with Dr. A. De Rossi and Dr. R. Cavoretto of the (University of Torino), Prof. A. Iske (University of Hamburg - Germany) and Dr. Wolfgang Erb (University of Luebeck - Germany). With Dr. Erb we are already collaborating in supervising the master's thesis of F. Marchetti, to the construction of Lissajous sampling with filtering for MPI image reconstruction. We have also involved a Ph.D. of the Department of Neuroscience of the University of Padova, Davide Poggiali and Prof. Diego Cecchin of the departmenmt of Medice, for the application to MRI by RBF.

3. PDEs on manifolds and applications.

The numerical solution of PDEs on manifolds has gained recent attention for the variety of applications to real world problem. It is still an open field of research with only limited consolidated experiences with several open questions. One of the numerical analysis problem we will address in this project is the development of accurate quadrature rules on surfaces for the evaluation of the integrals needed in any Finite Volume or Discontinuous-Galerkin based numerical solver [FL09, FL14, FU13].

Shallow water equations are classically used as models of environmental fluid dynamics when the horizontal (longitudinal and lateral) components of the flow field are predominant with respect to the vertical components. Applications of SWE range from large-scale ocean modeling [HI06] to atmospheric circulation [HO04], from river morphodynamics [LA06] to dam break and granular flows [IV14] to avalanches [GR99].
Digital Terrain Models (DTM) are generally approximated as Euclidian surfaces. A lot of research has been devoted to the geometric characterization of DTMs[OR14], but very little is known on how to describe the flow of water on surfaces with important and spatially varying curvatures. Starting from the the Shallow-Water equation written in covariant form using a local reference system with origin on the bottom surface to take into full consideration the effects of the surface geometry [BU04, FE16], we develop Finite Volume/Discontinuous Galerkin type discretization methods to solve the ensuing hyperbolic system of equations.

The references related to this third parts are listed in section 6.

3 Componenti il Gruppo di Ricerca

3.0 Personale docente e ricercatore dell'Università di Padova

nº	Cognome	Nome	Dipartimento	Qualifica	Settore	Stato della risposta
1.	*DE MARCHI*	*Stefano*	*DIP. MATEMATICA "TULLIO LEVI CIVITA" - DM*	*Professore Associato confermato*	*MAT/08*	*RESPONSABILE*
2.	*PUTTI*	*Mario*	*DIP. MATEMATICA "TULLIO LEVI CIVITA" - DM*	*Professore Associato confermato*	*MAT/08*	*ACCETTATO*

3.1 Altro Personale dell'Università di Padova

nº	Nominativo	Sede	Categoria

3.2 Titolari di assegni di ricerca dell'Università di Padova

nº	Cognome	Nome	Dipartimento	Inizio contratto	Fine contratto

3.3 Dottorandi e studenti di corsi di laurea magistrali dell'Università di Padova

nº	Cognome	Nome	Dipartimento	Anno del titolo
1.	*CARLINO*	*SARA*	*DIP. MATEMATICA "TULLIO LEVI CIVITA" - DM*	*2016*
2.	*FACCA*	*ENRICO*	*DIP. MATEMATICA "TULLIO LEVI CIVITA" - DM*	*2018*
3.	*MARCHETTI*	*FRANCESCO*	*DIP. MATEMATICA "TULLIO LEVI CIVITA" - DM*	*2016*
4.	*POGGIALI*	*DAVIDE*	*DIP. NEUROSCIENZE SCIENZE NPSRR - DNS*	*2017*
5.	*SCUDELER*	*CARLOTTA*	*DIP. INGEGNERIA CIVILE, EDILE E AMBIENTALE - ICEA*	*2017*

3.4 Personale docente e ricercatore di altre Università

nº	Cognome	Nome	Università	Dipartimento	Qualifica	Settore
1.	*DE ROSSI*	*Alessandra*	*Università degli Studi di TORINO*	*DIP. Matematica Giuseppe Peano*	*Ricercatore confermato*	*MAT/08*
2.	*CAVORETTO*	*Roberto*	*Università degli Studi di TORINO*	*DIP. Matematica Giuseppe Peano*	*Ricercatore a t.d. - t.pieno (art. 24 c.3-a L. 240/10)*	*MAT/08*

3.5 Personale extrauniversitario

nº	Cognome	Nome	Ente	Qualifica
1.	*ERB*	*WOLFGANG*	*Università di Lubecca*	*Post doc*
2.	*ISKE*	*ARMIN*	*Università di Amburgo*	*Professore ordinario*
3.	*SANTIN*	*GABRIELE*	*Università di Stoccarda*	*Post doc*

4 Pubblicazioni

4.0 Pubblicazioni scientifiche più significative del Responsabile Scientifico del Programma di Ricerca

nº	Pubblicazione
1.	*Stefano De Marchi, Gabriele Santin (2015). Fast computation of orthonormal basis for RBF spaces through Krylov space methods. BIT, vol. 55, p. 949-966, ISSN: 0006-3835, doi: 10.1007/s10543-014-0537-6 - Impact Factor 1.156*
2.	*S. De Marchi, F. Dell'Accio, M. Mazza (2015). On the constrained mock-Chebyshev least-squares. JOURNAL OF COMPUTATIONAL AND APPLIED MATHEMATICS, vol. 280, p. 94-109, ISSN: 1879-1778, doi: 10.1016/j.cam.2014.11.032*
3.	*Diego Cecchin, Davide Poggiali, Lucia Riccardi, Paolo Turco, Franco Bui, Stefano De Marchi (2015). Analytical and experimental FWHM of a gamma camera: theoretical and practical issues. PEERJ, vol. 3, ISSN: 2167-8359, doi: 10.7717/peerj.722*
4.	*André Pierro de Camargo, Stefano De Marchi (2015). A few remarks on "On certain Vandermonde determinants whose variables separate". DOLOMITES RESEARCH NOTES ON APPROXIMATION, vol. 8, p. 1-11, ISSN: 2035-6803, doi: 10.14658/pupj-drna-2015-1-1*
5.	*De Marchi Stefano, Piazzon Federico, Sommariva Alvise, Vianello Marco (2015). Polynomial Meshes: Computation and Approximation. In: (a cura di): J. Vigo-Aguiar, CMMSE 2015 : Proceedings of the 15th International Conference on Mathematical Methods in Science and Engineering. vol. I-II-III-IV, p. 414-425, CMMSE, ISBN: 978-84-617-2230-3*
6.	*Cavoretto R, De Marchi S, De Rossi A, Perracchione E, Santin G (2015). RBF approximation of large datasets by partition of unity and local stabilization. In: (a cura di): J. Vigo-Aguiar, Proceedings of the 15th International Conference on Computational and Mathematical Methods in Science and Engineering. vol. I-II-III-IV, p. 317-326, CMMSE, ISBN: 978-84-617-2230-3*
7.	*De Marchi Stefano (2016). Trivariate polynomial approximation on Lissajous curves. In: Sparse modelling and multi-exponential analysis (Dagstuhl Seminar 15251). vol. 5, p. 68, Dagsthul (Germania), giugno 2015, doi: 10.4230/DagRep.5.6.48*
8.	*Stefano De Marchi, Konstantin Usevich (2014). On certain multivariate Vandermonde determinants whose variables separate. LINEAR ALGEBRA AND ITS APPLICATIONS, vol. 449, p. 17-27, ISSN: 0024-3795, doi: 10.1016/j.laa.2014.01.034 -Impact Factor .983*
9.	*L. Bos, S. De Marchi, N. Levenberg (2014). Fekete Type Points for Ridge Function Interpolation and Hyperbolic Potential Theory . PUBLICATIONS DE L'INSTITUT MATHEMATIQUE, vol. 96, p. 41-48, ISSN: 0350-1302, doi: 10.2298/PIM1410041B*
10.	*S. De Marchi, A. Sommariva, M. Vianello (2014). Multivariate Christoffel functions and hyperinterpolation. DOLOMITES RESEARCH NOTES ON APPROXIMATION, vol. 7, p. 26-33, ISSN: 2035-6803*
11.	*L. Bos, S. De Marchi, K. Hormann, J. Sidon (2013). Bounding the Lebesgue constant of Berrut's rational interpolant at general nodes. JOURNAL OF APPROXIMATION THEORY, vol. 169, p. 7-22, ISSN: 0021-9045, doi: 10.1016/j.jat.2013.01.004 -Impact Factor .896*
12.	*Stefano De Marchi, Marco Vianello (2013). Polynomial approximation on pyramids, cones and solids of rotation. DOLOMITES RESEARCH NOTES ON APPROXIMATION, vol. 6, p. 20-26, ISSN: 2035-6803*
13.	*Stefano De Marchi, Gabriele Santin (2013). A new stable basis for radial basis function interpolation. JOURNAL OF COMPUTATIONAL AND APPLIED MATHEMATICS, vol. 253, p. 1-13, ISSN: 0377-0427, doi: 10.1016/j.cam.2013.03.048 -Impact Factor 1.077*
14.	*Bos Len, S. DE MARCHI, Hormann Kai, Klein Georges (2012). On the Lebesgue constant of barycentric rational interpolation at equidistant nodes. NUMERISCHE MATHEMATIK, vol. 121, p. 461-471, ISSN: 0029-599X, doi: 10.1007/s00211-011-0442-8 -Impact Factor 1.329*
15.	*Stefano De Marchi, Martina Marchioro, Alvise Sommariva (2012). Polynomial approximation and cubature at approximate Fekete and Leja points of the cylinder. APPLIED MATHEMATICS AND COMPUTATION, vol. 218, p. 10617-10629, ISSN: 0096-3003, doi: 10.1016/j.amc.2012.04.023 -Impact Factor 1.349*
16.	*K. Hormann, G. Klein, S. De Marchi (2012). Barycentric rational interpolation at quasi-equidistant nodes . DOLOMITES RESEARCH NOTES ON APPROXIMATION, vol. 5, p. 1-6, ISSN: 2035-6803*

nº	Pubblicazione
17.	*Len Bos, Stefano DE MARCHI, Kai Hormann (2011). On the Lebesgue constant of Berrut's rational interpolant at equidistant nodes. JOURNAL OF COMPUTATIONAL AND APPLIED MATHEMATICS, vol. 236, p. 504-510, ISSN: 0377-0427, doi: 10.1016/j.cam.2011.04.004 -Impact Factor 1.112*
18.	*L. Bos, S. De Marchi (2011). On the Whittaker--Shannon sampling by means of Berrut's rational interpolant and its extension by Floater and Hormann. EAST JOURNAL ON APPROXIMATIONS, vol. 17, p. 267-284, ISSN: 1310-6236*
19.	*L.BOS, S.DE MARCHI, A. SOMMARIVA, M.VIANELLO (2011). Weakly Admissible Meshes and Discrete Extremal Sets. NUMERICAL MATHEMATICS, vol. 4, p. 1-12, ISSN: 1004-8979 -Impact Factor .692*
20.	*M. CALIARI, S. DE MARCHI, A. SOMMARIVA, M. VIANELLO (2011). Padua2DM: fast interpolation and cubature at the Padua points in Matlab/Octave. NUMERICAL ALGORITHMS, vol. 56, ISSN: 1017-1398, doi: 10.1007/s11075-010-9373-1 -Impact Factor 1.042*
21.	*Bos Len, DE MARCHI Stefano (2011). On optimal points for interpolation by univariate exponent functions . DOLOMITES RESEARCH NOTES ON APPROXIMATION, vol. 4, p. 8-12, ISSN: 2035-6803*
22.	*L. BOS, S. DE MARCHI, A. SOMMARIVA, M. VIANELLO (2011). On Multivariate Newton Interpolation at Discrete Leja Points. DOLOMITES RESEARCH NOTES ON APPROXIMATION, vol. 4, p. 15-20, ISSN: 2035-6803*
23.	*Buhmann Martin, S. DE MARCHI, Plonka-Hoch Gerlind (2011). Dolomites Resarch Notes on Approximation (DRNA), Vol. 4, Special Issue for the Proceedings of Robert Schaback's 65th birthday. In: M. D. Buhmann, S. De Marchi, G. Plonka-Hoch. Approximation (DRNA), Vol. 4, Special Issue for the Proceedings of Robert Schaback's 65th birthday. DOLOMITES RESEARCH NOTES ON APPROXIMATION, vol. 4, p. 1-63, VERONA:Università di Verona, ISSN: 2035-6803, Goettingen, 14−15 January 2011*
24.	*Caliari Marco, De Marchi Stefano, Sommariva Alvise, Vianello Marco (2011). Padua2DM: fast interpolation and cubature at the Padua points in Matlab/Octave.*

4.1 Pubblicazioni scientifiche più significative dei componenti il gruppo di ricerca (personale docente dell'Università di Padova)

nº	Pubblicazione
1.	*S. Weill, M. Altissimo, G. Cassiani, R. Deiana, M. Marani, M. Putti (2013). Saturated area dynamics and streamflow generation from coupled surface–subsurface simulations and field observations. ADVANCES IN WATER RESOURCES, vol. 59, p. 196-208, ISSN: 0309-1708, doi: 10.1016/j.advwatres.2013.06.007* *Impact factor 2.78*
2.	*D. Pasetto, M. Putti, W. W-G. Yeh (2013). A reduced-order model for groundwater flow equation with random hydraulic conductivity: Application to Monte Carlo methods. WATER RESOURCES RESEARCH, vol. 49, p. 1-14, ISSN: 0043-1397, doi: 10.1002/wrcr.20136* *Impact factor 3.709*
3.	*R. Maxwell, M. Putti, S. Meyerhoff, J. d. Delfs, I. e. Ferguson, V. Ivanov, J. Kim, O. g. Kolditz, S. Kollet, M. Kumar, S. Lopez, J. Niu, C. Paniconi, Y. Park, M. Phanikumar, C. Shen, E. Sudicky, M. Sulis (2014). Surface-subsurface model intercomparison: A first set of benchmark results to diagnose integrated hydrology and feedbacks. WATER RESOURCES RESEARCH, vol. 50, ISSN: 0043-1397, doi: 10.1002/2013WR013725*
4.	*D. Pasetto, A. Guadagnini, M. Putti (2013). A reduced-order model for Monte Carlo simulations of stochastic groundwater flow. COMPUTATIONAL GEOSCIENCES, p. 1-13, ISSN: 1420-0597, doi: 10.1007/s10596-013-9389-4* *Impact factor 1.612*
5.	*G. Manoli, S. Bonetti, J. C. Domec, M. Putti, G. Katul, M. Marani (2014). Tree root systems competing for soil moisture in a 3D soil-plant model. ADVANCES IN WATER RESOURCES, vol. 66, p. 32-42, ISSN: 0309-1708, doi: 10.1016/j.advwatres.2014.01.006*
6.	*Lourenzo Beirao da Veiga, Gianmarco Manzini, Mario Putti (2015). Post processing of solution and flux for the nodal mimetic finite difference method. NUMERICAL METHODS FOR PARTIAL DIFFERENTIAL EQUATIONS, vol. 1, p. 336-363, ISSN: 0749-159X, doi: 10.1002/num.21907*
7.	*G. Manoli, M. Rossi, D. Pasetto, R. Deiana, S. Ferraris, G. Cassiani, M. Putti (2015). An iterative particle filter approach for coupled hydro-geophysical inversion of a controlled infiltration experiment. JOURNAL OF COMPUTATIONAL PHYSICS, vol. 283, p. 37-51, ISSN: 0021-9991, doi: 10.1016/j.jcp.2014.11.035*

nº	Pubblicazione
8.	*Bonetti Sara, Manoli Gabriele, Domec Jean-Christophe, Putti Mario, Marani Marco, Katul Gabriel G. (2015). The influence of water table depth and the free atmospheric state on convective rainfall predisposition. WATER RESOURCES RESEARCH, vol. 51, p. 2283-2297, ISSN: 0043-1397, doi: 10.1002/2014WR016431*
9.	*Paniconi Claudio, Putti Mario (2015). Physically based modeling in catchment hydrology at 50: Survey and outlook. WATER RESOURCES RESEARCH, vol. 51, p. 7090-7129, ISSN: 0043-1397, doi: 10.1002/2015WR017780*
10.	*Cassiani Giorgio, Boaga Jacopo, Rossi Matteo, Putti Mario, Fadda Giuseppe, Majone Bruno, Bellin Alberto (2015). Soil-plant interaction monitoring: Small scale example of an apple orchard in Trentino, North-Eastern Italy. SCIENCE OF THE TOTAL ENVIRONMENT, ISSN: 0048-9697, doi: 10.1016/j.scitotenv.2015.03.113*

4.2 Pubblicazioni scientifiche più significative dei componenti il gruppo di ricerca (altro personale dell'Università di Padova e docenti altri atenei)

1. R. Cavoretto, S. De Marchi, A. De Rossi, E. Perracchione and G. Santin: RBF approximation of large datasets by partition of unity and local stabilization, Proceedings CMMSE (2015), Vol. I-II-III-IV, pp. 317--326.

2. R. Cavoretto, S. De Marchi, A. De Rossi, E. Perracchione and G. Santin: Partition of unity interpolation using stable kernel-based techniques. Accepted by Appl. Numer. Math. 2016.

3. S. De Marchi, A. Iske and A. Sironi: Kernel-based Image Reconstruction from Scattered Radon Data, Hamburger Beiträge zur Angewandten Mathematik, 2016-11.

4. G. Santin and R. Schaback: Approximation of Eigenfunctions in Kernel-based Spaces, to appear on Adv. Comput. Math. 2016.

5 Richiesta di finanziamento

EURO: 8.000

6 Informazioni aggiuntive

This is the bibliography related to the third part that have been cut by the form

[BO04] Bouchout,F., Westdickenberg, M. Gravity driven shallow water models for arbitrary topography, Commun.Math.Sci., 2(3), (2004), 359â€“1227.

[FE16] Fent, I., Balsemin, L., Putti, M., Canestrelli, A., Gregoretti, C., Lanzoni, S.. Modeling shallow water flows on general terrains, J. Fluid Mech., (2016), submitted.

[FL09] N. Flyer, G.B.Wright (2009). A radial basis function method for the shallow water equations on a sphere. Proc. R. Soc. Lond. Ser. A Math. Phys. Eng. Sci., 465(2106), p1949.

[FL14] N. Flyer, G.Wright, B.Fornberg (2014). Radial basis function-generated finite differences: A mesh-free method for computational geosciences. In W. Freeden, M. Z. Nashed, and T. Sonar, edts, Handbook of Geo-mathematics, Springer Berlin Heidelberg, p1.

[FU13] E.J. Fuselier, G.B.Wright (2013). A high-order kernel method for diffusion and reaction- diffusion equations on surfaces. J. Sci. Comput., 56, p535.

[IV14] Iverson, R. M. & George, D. L. 2014 A depth-averaged debris-flow model that includes the effects of evolving dilatancy. I. Physical basis. Proc. R. Soc. Lond. A 470 (2170), 20130819â€“20130819.

[GR99] Gray, J. M. N. T., Wieland, M. & Hutter, K. 1999 Gravity-driven free surface flow of granular avalanches over complex basal topography. Phil. Trans. R. Soc. A 455 (1985), 1841â€“1874.

[HI06] Higdon, R. L. 2006 Numerical modelling of ocean circulation. Acta Num. 15, 385.

[HO04] Holton, J. R. 2004 An introduction to dynamic

meteorology. Burlington, MA: Elsevier Academic Press.

[HU05] K.Hutter, Y.Wang, S.P.Pudasaini (2005). The Savage-Hutter avalanche model: how far can it be pushed? Phil. Trans. R. Soc. A. 363, p1507.

(per la copia da depositare presso l'Ateneo e per l'assenso alla diffusione via Internet delle informazioni riguardanti i programmi finanziati e la loro elaborazione necessaria alle valutazioni; Ai sensi decreto legislativo 196/03 sulla "Tutela dei dati personali" i dati contenuti nella domanda di finanziamento sono trattati esclusivamente per lo svolgimento delle funzioni istituzionali dell'Ateneo.
Incaricato del trattamento dei dati è il Cineca.)

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