

# CURRICULUM VITAE AND LIST OF PUBLICATIONS

of

**Paolo Maria Santini**

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## **Personal Data**

**Name:** Paolo Maria Santini

**Place and date of birth:** Bologna, Italy. 28/05/1954

## **Education**

Laurea in Physics, 110/110 cum laude, December 1977. Supervisor: Prof. F.Calogero. Department of Physics, University of Roma “La Sapienza”.

PhD in Mathematics, May 1984. Supervisor: Prof. M.J.Ablowitz. Department of Mathematics, Clarkson University, Potsdam, N.Y., USA.

**Hobbies:** Drawing, playing guitar and listening music, reading books and watching movies.

## **Academic Positions**

November 2000 - present. Ordinary Professor of Theoretical Physics, Fis 02, Department of Physics, University of Roma “La Sapienza”.

November 1998 - October 2000. Associate Professor of Physics; Department of Physics, University of Roma “La Sapienza”.

November 1994 - October 1998. Associate Professor of Theoretical Physics; Department of Physics, University of Catania.

Academic years: 1986 - 87 and 1987 - 88. Visiting Professor; Department of Mathematics, Clarkson University, Potsdam, N.Y., USA.

September 1981 - October 1994. Tenur Researcher in Theoretical Physics, Department of Physics, University of Roma “La Sapienza”.

June 1978 - September 1981. Fellow in Mathematical Physics of the Italian National Council of Research (CNR). Supervisor: Prof. F.Calogero. Department of Physics, University of Roma “La Sapienza”.

## **Editorial Positions**

Editorial Board of Inverse Problems. 1992 - 1996.

## **International Programs and Workshops organized**

“NEEDS - Nonlinear Evolution Equations and Dynamical Systems”; Chania, Crete, 20/06-05/07 1985.

6 Month Programme “Integrable Systems” at the Newton Institute, Cambridge (UK). July - December 2001.

Euro-Conference: “NEEDS - Nonlinear Evolution Equations and Dynamical Systems”; Cambridge (UK). 24/07 - 31/07 2001.

Euro-Workshop: “Discrete Systems”; Cambridge (UK). 03/09 - 14/09 2001.

International Congress: “Integrability and Physics”; Dept. of Physics, Univ. “La Sapienza”. 25/03/2011.

## **Publications**

More than 100 papers. 20 in Conference and School Proceedings, or in Special Issues Volumes; the rest on international journals. One book (co-authored with C. Bernardini and O. Ragnisco) on Mathematical Methods of Physics.

## **Research Interests**

The theory of nonlinear (algebraic, differential, partial differential, integro-differential, difference, functional) equations treatable by spectral means. In particular,

1. the study of the rich mathematical aspects of such a theory, involving several branches of Mathematics: Algebra, Complex Analysis, Differential Geometry, Discrete Geometry, and Algebraic Geometry;
2. the study of the interesting applications to the Natural Sciences.

The scientific production can be grouped into the following research fields.

1. Longtime behaviour of solutions of nonlinear evolutionary systems, like the Kadomtsev-Petviashvili (KP) equation [4], describing the evolution of two-dimensional waves in shallow water; its  $x$ -dispersionless version [95], describing such evolution near the shore, when the wave breaks; the “heavenly” equation of Plebanski [88], describing self-dual Einstein fields.
2. Multiple scale expansions for integrable and non integrable PDEs, carried, in principle, to all orders, and the nonlinear Schrödinger hierarchy [56, 58, 59]. Application to the study of partial difference equations (P $\Delta$ E) in the small lattice spacing regime, as i) a vicinity test between the P $\Delta$ E and its continuous limit and ii) integrability test for the P $\Delta$ E [100].

3. Use of the Inverse spectral transform for soliton equations in 1+1 and 2+1 dimensions, to solve the Cauchy problem for distinguished soliton equations, like the sine-Hilbert equation [10, 12, 13] and the Davey-Stewartson equation [38, 39, 40, 41, 42, 43], a universal model in the description of the amplitude modulation of strongly dispersive two-dimensional waves in a weakly nonlinear medium, with the spectral characterization of the dromions, novel coherent structures on the plane.
4. Construction of the theory of recursion operators and bi - Hamiltonian structures for integrable PDEs in multidimensions [16, 17, 18, 19, 20, 21].
5. Construction of a theory of integrable discrete geometries based on the geometric notion of quadrilateral lattice [61, 63, 64, 65, 66, 67, 68, 69, 70].
6. Search and construction of novel and distinguished nonlinear integrable systems: algebraic and functional equations [34, 50], cellular automata [47, 51], integrable multidimensional PDEs with constraints [48], the so-called Sine-Hilbert equation [10, 12], integrable discrete geometries and several integrable generalizations of the Toda law on the square, triangular and honeycomb lattices [79, 94], a general matrix PDE in arbitrary dimensions integrable by the method of characteristics [91].
7. Development of variants of the Dressing method, to construct and solve integrable or quasi - integrable PDEs in multidimensions. In particular, the construction of nonlinear PDEs in ( $n$ ) dimensions possessing an analytic solution space of dimension ( $n - 2$ ) [86].
8. Development of spectral methods to solve initial - boundary value problems for integrable PDE's [72, 73, 82].
9. Study of the transition from integrable to chaotic behavior of dynamical systems on the plane, explained as travel on Riemann surfaces [84, 97].
10. Development of the Inverse Spectral Transform for integrable multidimensional PDEs arising from the commutation of one parameter families of multidimensional vector fields [88]. Applications of this theory to the heavenly equation of Plebanski (exact reduction of the Einstein equations) [88], to the dispersionless KP equation [90], with the analytic description of the gradient catastrophe of two-dimensional shallow water waves near the shore [95], and to the so-called dispersionless Toda equation in 2+1 dimensions, relevant in field theory and in the study of ideal Hele-Shaw flows [98]. Study of the universal way in which weakly nonlinear quasi onedimensional waves break in Nature [101].

## References

- [1] P. M. Santini: "Asymptotic behaviour (in  $t$ ) of solutions of the boomeron equation"; *Il Nuovo Cimento* 47B, 228 (1978).
- [2] P. M. Santini: "Asymptotic behaviour (in  $t$ ) of solutions of the cylindrical KdV equation. I"; *Il Nuovo Cimento* 54A, 241 (1979).
- [3] P. M. Santini: "Asymptotic behaviour (in  $t$ ) of solutions of the cylindrical KdV equation. II"; *Il Nuovo Cimento* 57A, 387 (1980).
- [4] S. V. Manakov, P. M. Santini and L. A. Takhtajan: "Asymptotic behaviour of the solutions of the Kadomtsev-Petviashvili equation (two dimensional Korteweg-de Vries equation)."; *Phys.Lett.* 75A, 451 (1980).
- [5] L. Martina and P. M. Santini: "Propagation of ion acoustic waves in cold inhomogeneous plasmas." *Lettere al Nuovo Cimento* 29, 513 (1980).
- [6] P. M. Santini: "On the evolution of two dimensional packets of water waves over an uneven bottom."; *Lettere al Nuovo Cimento* 30, 236 (1981).
- [7] D. Levi, L. Pilloni and P. M. Santini: "Backlund transformations for nonlinear evolution equations in 2+1 dimensions."; *Phys.Lett.* 81A, 419 (1981).
- [8] D. Levi, L. Pilloni and P. M. Santini: "Integrable three- dimensional lattices."; *J.Phys.* 14A, 1567 (1981).
- [9] P. M. Santini, M. J. Ablowitz and A. S. Fokas: "On the limit from the Intermediate Long Wave equation to the Benjamin-Ono equation."; *J.Math.Phys.* 25, 892 (1984).
- [10] A. Degasperis and P. M. Santini: "Linear operator and conservation laws for a class of nonlinear integro-differential evolution equations."; *Phys.Lett.* 98A, 240 (1983).
- [11] P. M. Santini, M. J. Ablowitz and A. S. Fokas: "The direct linearization of a class of nonlinear evolution equations."; *J.Math.Phys.* 25, 2614 (1984).
- [12] A. Degasperis, P. M. Santini and M. J. Ablowitz: "Nonlinear evolution equations associated with a Riemann-Hilbert scattering problem."; *J.Math.Phys.* 26, 2469 (1985).
- [13] P. M. Santini, M. J. Ablowitz and A. S. Fokas: "On the initial value problem for a class of nonlinear integral evolution equations including the sine-Hilbert equation."; *J.Math.Phys.* 28, 2310 (1987).
- [14] O. Ragnisco, P. M. Santini, S. C. Briggs and M. J. Ablowitz: "An example of  $\bar{\partial}$  problem arising in a finite difference context: direct and inverse problem for the discrete analogue of the equation  $\psi_{xx} + u\psi = \psi_y$ "; *J.Math.Phys.* 28, 777 (1987).

- [15] *P. M. Santini: "Nonlinear integral evolution equations associated with a Riemann- Hilbert scattering problem. Aspects of the initial value problem for the sine-Hilbert class."; in "Systemes Dynamiques non lineaires: integrabilite' et comportement qualitatif", edited by P.Winternitz, Proceedings of the Seminaire de Mathematiques Superieures; Les press de l'Universite' de Montreal, Montreal, 1986.*
- [16] *A. S. Fokas and P. M. Santini: "The recursion operator of the Kadomtsev-Petviashvili equation and the squared eigenfunctions of the Schroedinger operator."; Stud.Appl.Math. 75, 179 (1986).*
- [17] *P. M. Santini and A. S. Fokas: "Recursion operators and bi- hamiltonian structures in multidimensions.I."; Comm.Math.Phys. 115, 375-419 (1988).*
- [18] *A. S. Fokas and P. M. Santini: "Recursion operators and bi- hamiltonian structures in multidimensions.II."; Comm.Math.Phys. 116, 449-474 (1988).*
- [19] *P. M. Santini and A. S. Fokas: "Symmetries and bi-hamiltonian structures of 2+1 dimensional systems."; in Topics in Soliton Theory and Exactly Solvable Nonlinear Equations, edited by M.Ablowitz,B.Fuchssteiner and M.Kruskal, World Scientific, Singapore, 1987.*
- [20] *P. M. Santini: "Integrable 2+1 dimensional equations, their recursion operators and bi- hamiltonian structures as reduction of multidimensional systems"; in Inverse Problems: an Interdisciplinary Study; Supplement 19 of Advances in Electronics and Electron Physics, edited by P.C.Sabatier, Academic Press; London, New York, Tokyo, 1987.*
- [21] *A. S. Fokas and P. M. Santini: "Integrable equations in multidimensions (2+1) are bi- hamiltonian systems"; in Solitons, Introduction and Applications; Proceedings of the Winter School, Bharathidasan University, Tiruchirapalli, South India, 1987; edited by M.Lakshmanan, Springer-Verlag; Berlin, Heidelberg, New York, Tokyo, 1988.*
- [22] *O. Ragnisco and P. M. Santini: "Recursion operator and bi- hamiltonian structure for integrable multidimensional lattices."; J.Math.Phys. 29, 1593 (1988).*
- [23] *A. S. Fokas and P. M. Santini: "Bi-hamiltonian formulation of the Kadomtsev- Petviashvili and Benjamin-Ono equations."; J.Math.Phys. 29, 604 (1988).*
- [24] *P. M. Santini: "Bi-hamiltonian formulations of the Intermediate Long Wave equation."; Inverse Problems 5, 203 (1989).*
- [25] *P. M. Santini and A. S. Fokas: "The bi-hamiltonian formulations of integrable evolution equations in multidimensions."; in Proceedings of the*

- IV Workshop on Nonlinear Evolution Equations and Dynamical Systems; "Nonlinear evolutions", edited by J.Leon, World Scientific Publishing Company, Singapore, New Jersey, Hong Kong, 1988.*
- [26] P. M. Santini: "Dimensional Deformations of Integrable Systems: an Approach to Integrability in Multidimensions.I"; *Inverse Problems* 5, 67 (1989).
- [27] *P. M. Santini: "Old and New Results on the Algebraic Properties of Integrable Systems in Multidimensions"; in "Some topics on Inverse Problems"; Proceedings of the "XVIIth Workshop on Interdisciplinary Study of Inverse Problems", Montpellier, France, 1987; edited by P.C.Sabatier, World Scientific, Singapore, 1988.*
- [28] *M. Boiti, F. Pempinelli, F. Calogero and P. M. Santini: "Third Workshop on Nonlinear Evolution Equations and Dynamical Systems, a short summary"; Physica 29D, 431 (1988).*
- [29] *A. S. Fokas and P. M. Santini: "Conservation laws for integrable systems"; in "Symmetries and Nonlinear Phenomena"; Proceedings of the International School on Applied Mathematics, Bogota, Colombia; CIF series, Vol.9. Edited by D.Levi and P.Winternitz. World Scientific,1988.*
- [30] P. M. Santini: "The algebraic structures underlying integrability"; *Inverse Problems* 6, 99-114 (1990).
- [31] *P. M. Santini: "Algebraic properties and symmetries of integrable evolution equations"; in the Proceedings of the Symposium on "Symmetries in Science III", edited by B.Gruber; Landes-Bildungszentrum, Austria, July 25-28, 1988.*
- [32] *A. S. Fokas and P. M. Santini: "A unified approach to recursion operators"; in "Solitons in Physics, Mathematics and Nonlinear Optics", edited by P.Olver and D.Sattinger, Springer-Verlag, N.Y., 1990.*
- [33] O. Ragnisco and P. M. Santini: "A Unified Algebraic Approach to Integral and Discrete Evolution Equations"; *Inverse Problems* 6, 441 (1990).
- [34] P. M. Santini: "Solvable nonlinear algebraic equations"; *Inverse Problems* 6, 665 (1990).
- [35] *P. M. Santini: "Solvable nonlinear equations as concrete realizations of the same abstract algebra"; Proceedings Workshop on "Integrable Systems and Applications", Lecture Notes in Physics, 342; edited by M.Balabane, P.Lochak, C.Sulem; Springer-Verlag, Berlin, New York, 1988.*

- [36] A. Degasperis, D. Lebedev, M. Olshanetsky, S. Pakuliak, A. Perelomov and P. M. Santini; "Nonlocal integrable partners to generalized MKdV and two-dimensional Toda Lattice equation in the formalism of a Dressing Method with quantized spectral parameter"; *Comm. Math. Phys.* 141,133 (1991).
- [37] A. Degasperis, D. Lebedev, M. Olshanetsky, S. Pakuliak, A. Perelomov and P. M. Santini: Generalized intermediate long wave hierarchy in zero curvature representation with noncommutative spectral parameter; *J. Math. Phys.*33, 3783 (1992).
- [38] A. S. Fokas and P. M. Santini: "Coherent structures in multidimensions"; *Phys.Rev.Lett.* 63, 1329 (1989).
- [39] A. S. Fokas and P. M. Santini: "Dromions and a Boundary-value Problem for the Davey- Stewartson Equation; *Physica D*44, 99 (1990).
- [40] P. M. Santini: "Energy exchange of interacting coherent structures in multidimensions; *Physica D*41, 26 (1990).
- [41] *P. M. Santini and A. S. Fokas: "The Initial-Boundary Value Problem for the Davey- Stewartson I Equation; how to Generate and Drive Localized Coherent Structures in Multidimensions"; in "Partially Integrable Evolution Equations in Physics", edited by R.Conte and N.Bocchera, NATO ASI Series, Series C - Vol.310, Kluwer, Dordrecht, 1990.*
- [42] *P. M. Santini and A. S. Fokas: "Solitons and Dromions,coherent structures in a non linear world"; Proceedings of the V Workshop on "Nonlinear Evolution Equations and Dynamical Systems"; edited by S.Carillo and O.Ragnisco; Springer- Verlag, Berlin, 1990.*
- [43] *P. M. Santini and A. S. Fokas: "Dromions, a new manifestation in nonlinear phenomena", in "Inverse Methods in Action", edited by P.C.Sabatier; Springer- Verlag, Berlin, 1990.*
- [44] A. S. Fokas and P. M. Santini: "On the solution of certain systems of nonlinear algebraic equations"; Preprint INS n.157, Clarkson University, 1990.
- [45] *B. A. Dubrovin, A. S. Fokas and P.M.Santini: "Spectral theory of linear l-matrices and the solution of certain nonlinear algebraic and functional equations"; in Proceedings "III Postdam-V Kiev" Workshop, August 1991.*
- [46] M. Bruschi, O. Ragnisco, P. M. Santini and Tu Guizhang: "Integrable symplectic maps" *Physica D* 49, 273 (1990).
- [47] M. Bruschi, P. M. Santini and O. Ragnisco: "Integrable cellular automata". *Phys. Letters A* 169, 151 (1992).

- [48] P. M. Santini: "Integrable nonlinear evolution equations with constraints", *Inverse Problems* **8**, 285 (1992).
- [49] P. M. Santini: "Integrable singular integral evolution equations"; in "Important Developments in Soliton Theory", edited by A.S.Fokas and V.E.Zakharov, Springer Verlag (1992).
- [50] B. A. Dubrovin, A. S. Fokas and P. M. Santini: "Integrable functional equations and Algebraic-Geometry; *Duke Mathematical Journal* **76**, 645-668 (1994).
- [51] M. Bruschi and P. M. Santini: "Cellular automata in 1+1, 2+1 and 3+1 dimensions, constants of motion and coherent structures"; *Physica D* **70**, 185-209 (1994).
- [52] A. Doliwa and P. M. Santini: "An elementary geometric characterization of the integrable motions of a curve"; *Phys. Lett. A* **185**, 373 (1994).
- [53] C. Bernardini, O. Ragnisco e P. M. Santini: "Metodi Matematici della Fisica"; *La Nuova Italia Scientifica*, 1993.
- [54] A. Doliwa and P. M. Santini: "Integrable dynamics of a discrete curve and the Ablowitz-Ladik hierarchy"; *J.Math.Phys.* **36**, 1259-1273 (1995).
- [55] *A. Doliwa and P. M. Santini: "The integrable dynamics of discrete curves", in: "Symmetries and Integrability of Difference Equations"; eds. D. Levi, L. Vinet and P. Winternitz, CRM Proceedings and Lecture Notes, Vol. 9, AMS Providence, 1996.*
- [56] A. Degasperis, S. V. Manakov and P. M. Santini: "Multiple-Scale Perturbation beyond the Nonlinear Schrödinger Equation. I", *Physica D*, **100**, 187-211 (1997).
- [57] P. M. Santini: "Linear Theories, Hidden variables and Integrable Nonlinear Equations"; *Phys. Lett.* **212 A**, 43 (1996).
- [58] *P. M. Santini: "The Method of the Multiple-Scales and the Nonlinear Schrödinger Hierarchy", Proceedings of the 1<sup>st</sup> Workshop "Nonlinear Physics, Theory and Experiments", Gallipoli (Lecce); edited by E.Alfinito, M.Boiti, L.Martina and F.Pempinelli, World Scientific, 1996.*
- [59] *P. M. Santini: "Multiscale expansions, symmetries and the nonlinear Schrödinger hierarchy", in "Algebraic Aspects of Integrable Systems, In Memory of Irene Dorfman", edited by A.S.Fokas and I.M.Gelfand, Vol. 26, Birkhauser (Boston), 1996.*
- [60] M. Manas and P. M. Santini: "Solutions of the Davey - Stewartson II equation with arbitrary rational localization and nontrivial interaction"; *Physics Letters A* **227**,325-334 (1997).

- [61] A. Doliwa and P. M. Santini: “Multidimensional quadrilateral lattices are integrable”; Physics Letters **A 233**, 365-372 (1997).
- [62] M. Manas, A. Doliwa and P. M. Santini: “Darboux transformations for multidimensional quadrilateral lattices.I”; Physics Letters **A 232**, 99-105 (1997).
- [63] J. Cieslinski, A. Doliwa and P. M. Santini: “The integrable discrete analogues of orthogonal coordinate systems are multidimensional circular lattices”. Physics Letters **A 235**, 480-488 (1997).
- [64] A. Doliwa, S. V. Manakov and P. M. Santini: “ $\bar{\partial}$  - reductions of the multidimensional quadrilateral lattice I: the multidimensional circular lattice”. Commun. Math. Phys. **196**, 1-18 (1998).
- [65] *A. Doliwa and P. M. Santini: “Geometry of discrete curves and lattices and integrable difference equations”. Published in the book “Discrete Integrable Geometry and Physics”; editors A. Bobenko and R. Seiler, Oxford University Press (1999).*
- [66] A. Doliwa, P. M. Santini and M. Manas: “Transformations of Quadrilateral Lattices”. J. Math. Phys. **41** (2000) 944 - 990.
- [67] A. Doliwa, M. Manas, L. Martinez Alonso, E. Medina and P. M. Santini: “Charged Free Fermions, Vertex Operators and Classical Transformations of Conjugate Nets”. J. Phys. A **32** (1999) 1197-1216.
- [68] A. Doliwa and P. M. Santini: “The symmetric, d-invariant and Egorov reductions of the quadrilateral lattice”; J. Geometry and Physics **36**, (2000) 60-102.
- [69] *A. Doliwa and P. M. Santini: “Integrable Discrete Geometry: The Quadrilateral Lattice, its Transformations and Reductions”; CRM Proceedings and Lecture Notes, Volume 25, (2000) 101-119.*
- [70] A. Doliwa, M. Nieszporski and P. M. Santini: “Asymptotic lattices and their integrable reductions I: the Bianchi - Ernst and the Fubini - Ragazzi lattices”; J. Phys. A: Math. and Gen. **34** (2001), 10423-10439.
- [71] A. Degasperis, S. V. Manakov and P. M. Santini: “On the initial - boundary value problems for soliton equations”; JETP Letters, Vol. **74**, No. 10, (2001) 481-485.
- [72] A. Degasperis, S. V. Manakov and P. M. Santini: “Initial-boundary value problems for linear PDEs: the analyticity approach”; in “New trends in integrability and partial solvability”, 79-103 (2004). Edited by A.B.Shabat et al., Kluwer Academic Publishers. arXiv:nlin.SI/0210058.

- [73] A. Degasperis, S. V. Manakov and P. M. Santini: “Initial-boundary value problems for linear and soliton PDEs”; “NEEDS 2001-Special Issue” of Theor. Math. Phys., **133**: 1475-1489 (2002). arXiv:nlin.SI/0205030.
- [74] P. M. Santini: “Transformations and reductions of integrable nonlinear equations and the  $\bar{\partial}$  problem”; in: *Geometry and Integrability* (edited by L. Mason and Y. Nutku), London Mathematical Society Lecture Notes, vol. **295**, Cambridge University Press, 2003.
- [75] P. G. Grinevich and P. M. Santini: “The initial - boundary value problem on the segment for the Nonlinear Schrödinger equation; the algebro-geometric approach. I”. In: *Geometry, Topology and Mathematical Physics: S. P. Novikov Seminar 2001 - 2003*, V. M. Buchstaber, I. M. Krichever, editors, American Mathematical Society Translations – Series 2, Vol. 212, 157-178, 2004. Preprint arXiv:nlin.SI/0307026.
- [76] M. Nieszporski, P. M. Santini and A. Doliwa: “Darboux transformations for 5-point and 7-point self-adjoint schemes and an integrable discretization of the 2D Schrödinger operator”; Phys. Lett. A. **323** (2004) 241-250. arXiv:nlin.SI/0307045.
- [77] A. Doliwa, M. Nieszporski and P. M. Santini: “Geometric discretization of the Bianchi system”; Journal of Geometry and Physics. **52** (issue 3), 217-240 (2004). arxiv:nlin.SI/0312005.
- [78] M. Nieszporski and P. M. Santini: “The self-adjoint 5-point and 7-point difference operators, the associated Dirichlet problems, Darboux transformations and Lelievre formulas”; Glasgow Math. J. **47**, 1-15 (2005). arXiv:nlin.SI/0402038.
- [79] P. M. Santini, M. Nieszporski and A. Doliwa: “An integrable generalization of the Toda law to the square lattice”; Physical Review E **70**, 1 (2004). arXiv:nlin/0409050.
- [80] A. Doliwa, P. G. Grinevich, M. Nieszporski and P. M. Santini: “Integrable lattices and their sublattices: from the discrete Moutard (discrete Cauchy-Riemann) 4-point equation to the self-adjoint 5-point scheme”; J. Math. Phys. **48**, 013513 (2007). Preprint nlin.SI/0410046.
- [81] A. Doliwa and P. M. Santini: “Integrable systems and discrete geometry”; in the *Encyclopedia of Mathematical Physics*, edited by J.-P. Francoise, G. Naber and Tsou Sheung Tsun, Oxford: Elsevier, 2006 (ISBN 978-0-1251-2666-3). <http://arXiv.org/abs/nlin/0504041>
- [82] A. Degasperis, S. V. Manakov and P. M. Santini: “Integrable and nonintegrable initial-boundary value problems for soliton equations”; JNMP, **12**, Supplement 1, 228-243, 2005.

- [83] U. Mugan, A. Sakka, P. M. Santini: “Schlesinger transformations for discrete Painlevé equation:  $d - P_{II}$ ”; Phys. Lett. A, **336**, 37-45, 2005.
- [84] F. Calogero, D. Gomez-Ullate, P. M. Santini and M. Sommacal: “The transition from regular to irregular motion as travel on Riemann surfaces”; J. Phys. A: Math. Gen. 38 (2005) 8873-8896. <http://arXiv:nlin.SI/0507024>.
- [85] S. V. Manakov and P. M. Santini: “Inverse scattering problem for vector fields and the heavenly equation”; <http://arXiv:nlin.SI/0512043>.
- [86] A. I. Zenchuk and P. M. Santini: “Partially integrable systems in multidimensions by a variant of the dressing method. 1”; J. Phys. A: Math. Gen. 39 (2006) 5825-5845. <http://arXiv:nlin.SI/0512062>.
- [87] S. V. Manakov and P. M. Santini: “The Cauchy problem on the plane for the dispersionless Kadomtsev-Petviashvili equation”; JETP Letters, **83**, No 10, 462-466 (2006). <http://arXiv:nlin.SI/0604016>.
- [88] S. V. Manakov and P. M. Santini: “Inverse scattering problem for vector fields and the Cauchy problem for the heavenly equation”; Phys. Lett. A **359**, 613-619 (2006). <http://arXiv:nlin.SI/0604017>.
- [89] P. G. Grinevich and P. M. Santini: “Newtonian dynamics in the plane corresponding to straight and cyclic motions on the hyperelliptic curve  $\mu^2 = \nu^n - 1$ ,  $n \in \mathbb{Z}$ : ergodicity, isochrony, periodicity and fractals”; Physica D **232** (2007) 22-32. <http://arXiv:nlin.CD/0607031>.
- [90] S. V. Manakov and P. M. Santini: “A hierarchy of integrable PDEs in 2+1 dimensions associated with 1 - dimensional vector fields”; Theor. Math. Phys. **152**: 1004-1011 (2007). <http://arXiv:nlin.SI/0611047>
- [91] P. M. Santini and A. I. Zenchuk: “The general solution of the matrix equation  $w_t + \sum_{k=1}^n w_{x_k} \rho^{(k)}(w) = \rho(w) + [w, T\tilde{\rho}(w)]$ ”; Physics Letters **A 368** (2007) 48-52. [arXiv:nlin.SI/0612036](http://arXiv:nlin.SI/0612036).
- [92] A. I. Zenchuk and P. M. Santini: “Dressing method based on homogeneous Fredholm equation: quasilinear PDEs in multidimensions”; J. Phys. A: Math. Theor. **40** (2007) 6147-6174. [arXiv:nlin.SI/0701031](http://arXiv:nlin.SI/0701031).
- [93] A. Doliwa, M. Nieszporski and P. M. Santini: “Integrable lattices and their sublattices II. From the B-quadrilateral lattice to the self-adjoint schemes on the triangular and the honeycomb lattices”, JMP **48** 113506. [arXiv:0705.0573](http://arXiv:0705.0573).
- [94] P. M. Santini, A. Doliwa, M. Nieszporski: “Integrable dynamics of Toda-type on the square and triangular lattices”, Phys. Rev. E **77**, 056601-12 pp ISSN: 1539-3755 (2008). [arXiv:0710.5543](http://arXiv:0710.5543).

- [95] S. V. Manakov and P. M. Santini: “On the solutions of the dKP equation: nonlinear Riemann Hilbert problem, longtime behaviour, implicit solutions and wave breaking”, *J.Phys.A: Math.Theor.* **41** (2008) 055204. (arXiv:0707.1802 (2007))
- [96] A. I. Zenchuk and P. M. Santini: “On the remarkable relations among PDEs integrable by the inverse spectral transform method, by the method of characteristics and by the Hopf-Cole transformation”. *J. Phys. A: Math. Theor.* **41** No 18 185209 (28pp) (2008). arXiv:0801.3945.
- [97] F. Calogero, D. Gomez-Ullate, P. M. Santini, M. Sommacal: “Towards a Theory of Chaos Explained as Travel on Riemann Surfaces”, *J. Phys. A: Math. Theor.* **42** (2009) 015205 (26pp). arXiv:0805.4130v1 .
- [98] S. V. Manakov and P. M. Santini: “The dispersionless 2D Toda equation: dressing, Cauchy problem, longtime behavior, implicit solutions and wave breaking”, *J. Phys. A: Math. Theor.* **42** (2009) 095203 (16pp). doi:10.1088/1751-8113/42/9/095203. ArXiv:0810.4676
- [99] S. V. Manakov and P. M. Santini: “On the solutions of the second heavenly and Pavlov equations”, *J. Phys. A: Math. Theor.* **42** (2009) 404013 (11pp). doi: 10.1088/1751-8113/42/40/404013. ArXiv:0812.3323.
- [100] P. M. Santini, “Multiscale expansions of difference equations in the small lattice spacing regime, and a vicinity and integrability test. I”, *J. Phys. A: Math. Theor.* **43** (2010) 045209 (27pp) doi: 10.1088/1751-8113/43/4/045209 . ArXiv:0908.1492
- [101] S. V. Manakov and P. M. Santini: “On the dispersionless Kadomtsev-Petviashvili equation in  $n+1$  dimensions: exact solutions, the Cauchy problem for small initial data and wave breaking”, ArXiv:1001.2134.
- [102] S. V. Manakov and P. M. Santini: “Solvable vector nonlinear Riemann problems, exact implicit solutions of dispersionless PDEs and wave breaking”, arXiv:1011.2619.
- [103] U. Mugan and P. M. Santini: “On the Solvability of Discrete Second Painlevé Equation”, *J. Phys. A: Math. Theor.* **44** (2011) 185204.
- [104] David Gomez-Ullate, Paolo Santini, Matteo Sommacal, Francesco Calogero: “Understanding complex dynamics by means of an associated Riemann surface”, arXiv:1104.2205 (Physica D, submitted to).