Quantum Integrability and Quantum Groups: 
a special issue in memory of Petr P. Kulish 

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\textbf{Abstract}

This is an introduction to Quantum Integrability and Quantum Groups, a special issue collection of articles published in Journal of Physics A in memory of Petr P. Kulish. A list of Kulish's publications is included.

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1 Petr P. Kulish: a brief scientific biography

With deep regret we dedicate the present issue of Journal of Physics A to the memory of our late colleague and friend Professor Petr Kulish. Petr Petrovich Kulish was born on February 24, 1944 in Leningrad. He passed away on January 14 2016. Kulish graduated from Leningrad University (now St. Petersburg University) in 1966. He worked all his life at the Leningrad (later St. Petersburg) branch of the Mathematical Institute of the Academy of Science. He received his PhD in 1971, and the habilitation degree in 1983. He became a Professor of St. Petersburg University in 1991. From 2000 he was head of the Laboratory of Mathematical Methods in Theoretical Physics, which had been founded and headed by Professor L. D. Faddeev since 1972.

He was one of the first students of L. D. Faddeev. His first significant contribution to mathematical physics was a joint paper with Faddeev on the infrared problem in Quantum Electrodynamics where they proposed the construction of infrared asymptotic states. His research interests ranged from quantum field theory to the theory of solitons, classical and quantum integrable systems, and algebraic structures related to integrable systems, such as quantum groups and related algebras. (A complete list of his publications can be found in Section 3.)

During the 70’s he was in the center of activity both on classical and on quantum soliton theory. His contributions consist of several important results. Among them are connections of conservation laws and asymptotic scattering, semiclassical quantization of the Bose gas system, and the deformation of conservation laws. Together with younger colleagues A. Reiman and V. Gerdzhikov, he developed the general theory of recursion operators in the classical theory of solitons.

From the beginning of the 80’s Professor Kulish actively worked on the Quantum Inverse Scattering Method (QISM), algebraic Bethe Ansatz, the R-matrix approach and on quantum groups. The very first example of a quantum group appeared in his joint paper with N. Reshetikhin in 1981, where the XXZ integrable magnetic chain of higher spin was introduced in the framework of algebraic Bethe Ansatz. His early joint reviews with E. Sklyanin on the R-matrix method and on the Yang-Baxter equation were very influential at the time and still remain an important reference. The fusion method for quantum R-matrices developed in a joint paper with N. Reshetikhin and E. Sklyanin became one of the principal tools in the representation theory of quantum groups. His other highly important contributions are the multicomponent Bethe Ansatz, as well as the supersymmetric version of the QISM.

Petr Kulish continued to work very actively on the theory of quantum groups and its applications to integrable systems in the 90’s and in the 2000’s. Among his results are the studies of the q-oscillators of the algebraic systems connected with the reflection equations, as well as of the quantization of the Lorentz group (with eventual applications to quantization of space-time).

Besides his research, Professor Kulish had outstanding qualities as a teacher. Kulish had many graduate students, some of whom became notable researchers. He was an invited speaker in numerous international conferences and schools. He held visiting positions in many universities in Finland, France, Portugal, Spain, Sweden and Italy where he would

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establish very active collaborations with local scientists. Mathematical physics was his life. He was the second senior member of the Laboratory after L. D. Faddeev, where he started to work as a graduate student and finished as its director. For all who knew him all these years it is difficult to imagine this place without Petr. He is survived by his wife, Olga Kulish, his daughters Anna and Tatjana, and his grandchildren Maxim and Veronica. He will be deeply missed by his friends and colleagues.

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Figure 1: Petr Petrovich Kulish. Photo credit: Michael Semenov-Tian-Shansky

2 Contents of the special issue collection

We are very grateful to the many friends and colleagues of Petr Kulish who contributed to this special issue collection. Their enthusiastic support for this remembrance, and the breadth of subjects covered by their articles, are a testament to the deep and wide impact of Kulish and his work. The articles in the collection fall into roughly four areas, all of which benefited from seminal contributions by Kulish: integrable classical models, integrable quantum field theories, integrable quantum lattice models, and quantum groups. Brief introductions to these articles are presented below.
2.1 Integrable classical models

A finite-dimensional superintegrable model, with non-abelian integrals of motion, is constructed and investigated in [1]. New techniques for studying soliton solutions in the Kadomtsev - Petviashvili (KP) II model are developed in [2]. The scattering by integrable defects of finite-gap (quasi-periodic) solutions to the sine-Gordon and Korteweg - de Vries (KdV) models is studied in [3]. Bäcklund-gauge transformations for the KdV hierarchy are proposed in [4]. Hamiltonian reduction and other techniques from Poisson geometry and geometry of Poisson Lie groups are used in [5] to derive various multiparticle integrable systems. Integrable deformations of sigma models and their connection to non-abelian duality are investigated in [6].

2.2 Integrable quantum field theories

The sausage model is an integrable deformation of the two-dimensional $O(3)$ nonlinear sigma model; and nonlinear integral equations describing the ground state of this QFT are proposed in [7]. Integrable boundary conditions for the two-dimensional $O(N)$ nonlinear sigma model, both at the classical and quantum levels, are analyzed in [8]. Form factors for the $O(2n)$ Gross-Neveu model are constructed in [9]. Form factors for the $SU(N) \times SU(N)$ Principal Chiral Field model are obtained in [10]. In [11], the non-relativistic limits of the Gross-Neveu model and the supersymmetric sinh-Gordon and nonlinear sigma models are investigated. A certain topological CFT is explicitly analyzed in [12]. A new method of computation of vacuum expectation values (VEV) in massive integrable field theories is proposed in [13], it leads, in particular, to some new predictions for the quantum entanglement entropy. Macdonald refined topological vertex introduced and studied in [14] is a combinatorial construction closely related to the instanton partition function and AGT conjecture.

Several contributions explore integrability in planar AdS/CFT. Three-point functions in $\mathcal{N} = 4$ super Yang-Mills theory (SYM) are computed in [15]. Evidence for integrability in the null dipole deformation of $\mathcal{N} = 4$ SYM is found in [16]. One-point functions in a defect CFT are evaluated in [17].

2.3 Integrable quantum lattice models

In [18], XXZ models associated with quantum toroidal algebras are investigated; and a set of Bethe equations are conjectured to describe the spectrum of non-local integrals of motion for the quantum KdV model. Scalar products of Bethe vectors in models with $gl(2|1)$ symmetry are computed in [19] [20]. A new family of integrable Markov processes, based on corresponding stochastic R-matrices, has recently been introduced; and a matrix product formula for the steady-state probabilities is obtained in [21]. A fast approach for determining solutions of the Bethe equations for $gl(n|m)$ spin chains is presented in [22]. The $sl(2)$ Hirota equation is shown to admit a Lax representation with inhomogeneous terms in [23]. Integrable $A_{2n}^{(2)}$ open spin chains with quantum group symmetry are studied in [24]. A rational R-matrix that takes values in the adjoint representation of $su(n)$, and the corresponding
integrable spin chain Hamiltonian, are constructed in [25]. A novel way of “closing” open spin chains based on the Temperley-Lieb algebra is studied in [26]. The construction and solution of integrable models describing boson tunneling in multi-well systems are presented in [27]. An integrable model of quantum nonlinear optics is analyzed in [28]. A new Bethe ansatz solution for the relativistic quantum Toda chain is presented in [29]. An unusual type of scale invariance on the lattice is explored in [30]. Gustafson integrals and their generalisations frequently appear in the framework of the Separation of Variables for quantum spin chains. Several new results for this type of integrals are obtained in [31] for the compact case and in [32] for the non-compact case. The separation of variables method is also used in [33] to obtain new scalar product formulas and form factors for open spin chains with non-diagonal boundaries. The study of form factors for the quantum transfer matrix eigen-states is the subject of [34], where this approach is used to study the correlation function in the zero temperature limit. The stability of the spinon excitations for the spin chain with a weak non-integrable perturbation is explored in [35]. The spectrum of integrable super-spin chains is considered in [36] for various boundary conditions. The two-dimensional dimer mode is studied in [37] through its correspondence to the free-fermion point of the six-vertex model.

2.4 Quantum groups

Distinguished quasi-trigonometric solutions of the classical Yang-Baxter equation are found in [38]. The $q$-deformation of maximally extended $sl(2|2)$ is investigated by means of a contraction limit in [39]. The dynamical analog of central elements of elliptic quantum algebras is studied in [40]. A formula for the scalar product of semiclassical eigenvectors of two integrable systems on the same symplectic manifold, which leads to the Ponzano-Regge type of asymptotic of Racah-Wigner coefficients, is found in [41].

3 Petr P. Kulish: publications

The list of publications of Petr P. Kulish, compiled using MathSciNet, ISI Web of Science and a list produced by Kulish himself in 2004, can be found below [42]-[266].

References

[1] G. Arutyunov, M. Heinze, and D. Medina-Rincon, “Superintegrability of Geodesic Motion on the Sausage Model,” *J. Phys. A50* no. 24, (2017) 244002, arXiv:1608.06481 [hep-th].

[2] M. Boiti, F. Pempinelli, and A. K. Pogrebkov, “KPII: Cauchy-Jost function, Darboux transformations and totally nonnegative matrices,” *J. Phys. A50* (2017) 304001, arXiv:1611.04198 [nlin.SI].
[3] E. Corrigan and R. Parini, “Type I integrable defects and finite-gap solutions for KdV and sine-Gordon models,” *J. Phys. A50* no. 28, (2017) 284001, arXiv:1612.06904 [hep-th]

[4] J. F. Gomes, A. L. Retore, and A. H. Zimerman, “Miura and generalized Bcklund transformation for KdV hierarchy,” *J. Phys. A49* no. 50, (2016) 504003, arXiv:1610.02303 [nlin.SI]

[5] L. Feher and I. Marshall, “The actionangle dual of an integrable Hamiltonian system of RuijsenaarsSchneidervan Diejen type,” *J. Phys. A50* no. 31, (2017) 314004, arXiv:1702.06514 [math-ph]

[6] B. Hoare and A. A. Tseytlin, “Homogeneous Yang-Baxter deformations as non-abelian duals of the AdS5 sigma-model,” *J. Phys. A49* no. 49, (2016) 494001, arXiv:1609.02550 [hep-th]

[7] C. Ahn, J. Balog, and F. Ravanini, “Nonlinear integral equations for the sausage model,” *J. Phys. A50* no. 31, (2017) 314005, arXiv:1701.8933 [hep-th]

[8] I. Aniceto, Z. Bajnok, T. Gombor, M. Kim, and L. Palla, “On integrable boundaries in the 2 dimensional *O(N)* σ-models,” *J. Phys. A50* no. 36, (2017) 364002, arXiv:1706.05221 [hep-th]

[9] H. M. Babujian, A. Foerster, and M. Karowski, “Bethe ansatz and exact form factors of the *O(6)* Gross Neveu-model,” *J. Phys. A50* no. 33, (2017) 334003, arXiv:1703.05973 [hep-th]

[10] S. Frolov, “Free field representation of the ZF algebra of the SU(N) × SU(N) PCF model,” *J. Phys. A50* no. 37, (2017) 374001, arXiv:1705.02602 [hep-th]

[11] A. Bastianello, A. De Luca, and G. Mussardo, “Non Relativistic Limit of Integrable QFT with fermionic excitations,” *J. Phys. A50* no. 23, (2017) 234002, arXiv:1701.06542 [hep-th]

[12] A. Belavin and V. Belavin, “On exact solution of topological CFT models based on KazamaSuzuki cosets,” *J. Phys. A49* no. 41, (2016) 41LT02, arXiv:1606.05366 [hep-th]

[13] O. Blondeau-Fournier and B. Doyon, “Expectation values of twist fields and universal entanglement saturation of the free massive boson,” *J. Phys. A50* no. 27, (2017) 274001, arXiv:1612.04238 [hep-th]

[14] O. Foda and J.-F. Wu, “A Macdonald refined topological vertex,” *J. Phys. A50* no. 29, (2017) 294003, arXiv:1701.08541 [hep-th]

[15] Y. Jiang, S. Komatsu, I. Kostov, and D. Serban, “Clustering and the Three-Point Function,” *J. Phys. A49* no. 45, (2016) 454003, arXiv:1604.03575 [hep-th]
[16] M. Guica, F. Levkovich-Maslyuk, and K. Zarembo, “Integrability in dipole-deformed $\mathcal{N} = 4$ super Yang-Mills,” *J. Phys. A50* no. 39, (2017) 394001, arXiv:1706.07957 [hep-th].

[17] M. de Leeuw, C. Kristjansen, and G. Linardopoulos, “One-point functions of non-protected operators in the SO(5) symmetric D3D7 dCFT,” *J. Phys. A50* no. 25, (2017) 254001, arXiv:1612.06236 [hep-th].

[18] B. Feigin, M. Jimbo, and E. Mukhin, “Integrals of motion from quantum toroidal algebras,” *J. Phys. A50* no. 46, (2017) 464001, arXiv:1705.07984 [math.QA].

[19] A. Hutsalyuk, A. Liashyk, S. Z. Pakuliak, E. Ragoucy, and N. A. Slavnov, “Scalar products of Bethe vectors in models with $\mathfrak{gl}(2|1)$ symmetry 1. Super-analog of Reshetikhin formula,” *J. Phys. A49* no. 45, (2016) 454005, arXiv:1605.09189 [math-ph].

[20] A. Hutsalyuk, A. Liashyk, S. Z. Pakuliak, E. Ragoucy, and N. A. Slavnov, “Scalar products of Bethe vectors in models with $\mathfrak{gl}(2|1)$ symmetry 2. Determinant representation,” *J. Phys. A50* no. 3, (2017) 034004, arXiv:1606.03573 [math-ph].

[21] A. Kuniba and M. Okado, “Matrix product formula for $U_q(A_n^{(1)})$-zero range process,” *J. Phys. A50* no. 4, (2017) 044001, arXiv:1608.02779 [math.QA].

[22] C. Marboe and D. Volin, “Fast analytic solver of rational Bethe equations,” *J. Phys. A50* no. 20, (2017) 204002, arXiv:1608.06504 [math-ph].

[23] D. Fioravanti and R. I. Nepomechie, “An inhomogeneous Lax representation for the Hirota equation,” *J. Phys. A50* no. 5, (2017) 054001, arXiv:1609.06761 [math-ph].

[24] I. Ahmed, R. I. Nepomechie, and C. Wang, “Quantum group symmetries and completeness for $A_n^{(2)}$ open spin chains,” *J. Phys. A50* no. 28, (2017) 284002, arXiv:1702.01482 [math-ph].

[25] L. Stronks, J. van de Leur, and D. Schuricht, “On rational R-matrices with adjoint SU(n) symmetry,” *J. Phys. A49* no. 44, (2016) 444001, arXiv:1606.02516 [math-ph].

[26] J. Bellette, A. M. Gainutdinov, J. L. Jacobsen, H. Saleur, and R. Vasseur, “On the correspondence between boundary and bulk lattice models and (logarithmic) conformal field theories,” *J. Phys. A50* no. 48, (2017) 484002, arXiv:1705.07769 [hep-th].

[27] L. H. Ymai, A. P. Tonel, A. Foerster, and J. Links, “Quantum integrable multi-well tunneling models,” *J. Phys. A50* no. 26, (2017) 264001, arXiv:1606.00816 [math-ph].

[28] N. Bogoliubov, I. Ermakov, and A. Rybin, “Time evolution of the atomic inversion for the generalized Tavis-Cummings model - QIM approach,” *J. Phys. A50* no. 46, (2017) 464003, arXiv:1702.03740 [quant-ph].

6
[29] X. Zhang, J. Cao, W.-L. Yang, K. Shi, and Y. Wang, “Exact solution of the relativistic quantum Toda chain,” *J. Phys.* **A50** no. 12, (2017) 124003, arXiv:1609.07385 [math-ph]

[30] V. F. Jones, “Scale invariant transfer matrices and Hamiltonians,” arXiv:1706.00515 [math.OA]

[31] S. E. Derkachov and A. N. Manashov, “Spin chains and Gustafsons integrals,” *J. Phys.* **A50** no. 29, (2017) 294006, arXiv:1611.09593 [math-ph]

[32] S. E. Derkachov, A. N. Manashov, and P. A. Valinevich, “Gustafson integrals for $SL(2,\mathbb{C})$ spin magnet,” *J. Phys.* **A50** no. 29, (2017) 294007, arXiv:1612.00727 [math-ph].

[33] N. Kitanine, J. M. Maillet, G. Niccoli, and V. Terras, “The open XXX spin chain in the SoV framework: scalar product of separate states,” *J. Phys.* **A50** no. 22, (2017) 224001, arXiv:1606.06917 [math-ph].

[34] M. Dugave, F. Gohmann, K. K. Kozlowski, and J. Suzuki, “Thermal form factor approach to the ground-state correlation functions of the XXZ chain in the antiferromagnetic massive regime,” *J. Phys.* **A49** no. 39, (2016) 394001, arXiv:1605.07968 [cond-mat.stat-mech].

[35] S. Groha and F. H. L. Essler, “Spinon decay in the spin-1/2 Heisenberg chain with weak next nearest neighbour exchange,” *J. Phys.* **A50** no. 33, (2017) 334002, arXiv:1702.06550 [cond-mat].

[36] H. Frahm and K. Hobuß, “Spectral flow for an integrable staggered superspin chain,” *J. Phys.* **A50** no. 29, (2017) 294002, arXiv:1703.08054 [cond-mat.stat-mech].

[37] P. A. Pearce and A. Vittorini-Orgeas, “Yang-Baxter Solution of Dimers as a Free-Fermion Six-Vertex Model,” *J. Phys.* **A50** no. 43, (2017) 434001, arXiv:1612.09477 [math-ph].

[38] I. Burban, L. Galinat, and A. Stolin, “Simple vector bundles on a nodal Weierstrass cubic and quasi-trigonometric solutions of the classical Yang-Baxter equation,” *J. Phys.* **A50** (2017) 454002, arXiv:1704.07202 [math.AG].

[39] N. Beisert, R. Hecht, and B. Hoare, “Maximally extended $\mathfrak{s}(2|2)$, $q$-deformed $\mathfrak{o}(2,1;\epsilon)$ and 3D kappa-Poincaré,” *J. Phys.* **A50** no. 31, (2017) 314003, arXiv:1704.05093 [math-ph].

[40] J. Avan, L. Frappat, and E. Ragoucy, “Dynamical centers for the elliptic quantum algebra $B_{q,\lambda}(gl_2)_c$,” *J. Phys.* **A50** no. 39, (2017) 394002, arXiv:1703.05223 [math-ph].

[41] N. Reshetikhin, “Semiclassical geometry of integrable systems.”
[42] P. P. Kulish, “The inverse scattering problem for Schrödinger’s equation on the axis,” *Mat. Zametki* 4 (1968) 677–684. MR0244547

[43] P. P. Kulish and L. D. Faddeev, “Asymptotic conditions and infrared divergences in QED,” *Teoret. Mat. Fiz.* 4 (1970) 153–170. Theor. Math. Phys. 4 (1970) 745-757.

[44] M. Y. Amusia, M. P. Kazachkov, and P. P. Kulish, “On collective spectrum of a spin density wave electron gas,” *Physics Letters A* 32 no. 1, (1970) 27+

[45] P. P. Kulish, “Asymptotic conditions and infrared divergences in quantum field theory,” 1971. Autoreferat of Ph.D. Thesis (in Russian), 12pp, Leningrad State University.

[46] P. P. Kulish, “Asymptotic states of massive particles interacting with the gravitational field,” *Theoretical and Mathematical Physics* 6 no. 1, (Jan, 1971) 18–23. [https://doi.org/10.1007/BF01037574](https://doi.org/10.1007/BF01037574)

[47] P. P. Kulish, “Conservation laws for the sine-Gordon equation.”. (Serpukhov, IFVE), IFVE-74-155, Dec. 1974, 7pp.

[48] I. Y. Aref’eva and P. P. Kulish, “Representations of the canonical commutation relations in the limit of infinite volume,” *Teoret. Mat. Fiz.* 17 (1973) 3–18. MR0468719

[49] V. S. Gerdzhikov and P. P. Kulish, “Low-energy for photons and infrared divergences,” *Theoretical and Mathematical Physics* 18 no. 1, (Jan, 1974) 36–38. [https://doi.org/10.1007/BF01036923](https://doi.org/10.1007/BF01036923)

[50] V. S. Gerdzhikov and P. P. Kulish, “Low-energy structure of the feynman $s$ matrix,” *Theoretical and Mathematical Physics* 21 no. 2, (Nov, 1974) 1065–1073. [https://doi.org/10.1007/BF01035553](https://doi.org/10.1007/BF01035553)

[51] E. V. Damaskinsky and P. P. Kulish, “The current group of the Thirring model and its representations,” *Izv. Vysš. Učebn. Zaved. Fizika* no. 11, (1975) 57–62. MR0522299

[52] V. E. Korepin, P. P. Kulish, and L. D. Faddeev, “Soliton quantization,” *JETP Letters* 21 no. 5, (1975) 138–139. ISI:A1975AL15700014

[53] V. E. Korepin, P. P. Kulish, and L. D. Faddeev, “Quantization of solitons (in Russian).” Erevan 1975, Proceedings, Problems of Elementary Particle Physics Vol. 2, Erevan 1976, 458-464.

[54] P. P. Kulish and E. R. Nisimov, “Anomalies of quantum currents in exactly solvable models,” *Teoret. Mat. Fiz.* 29 no. 2, (1976) 161–170. MR0449295

[55] P. P. Kulish and E. R. Nisimov, “Conservation laws in the quantum theory cos $\phi$ in two-dimensions and in the massive Thirring model,” *Pisma Zh. Eksperim. I Teor. Fiz.* 24 (1976) 247–250.
[56] I. Y. Aref’eva, P. P. Kulish, E. R. Nisimov, and S. J. Pacheva, “Infinite set of conservation laws of the quantum chiral field in two-dimensional space-time.”. (Steklov Math. Inst., Leningrad), LOMI E-1-1978, Oct 1977, 29pp.

[57] P. P. Kulish, S. V. Manakov, and L. D. Faddeev, “Comparison of the exact quantum and quasiclassical results for the nonlinear Schrödinger equation,” Teoret. Mat. Fiz. 28 no. 1, (1976) 38–45. MR0462300

[58] P. P. Kulish, “Factorization of the classical and the quantum S-matrix, and conservation laws,” Teoret. Mat. Fiz. 26 no. 2, (1976) 198–205. MR0468929

[59] P. P. Kulish, “Conservation laws for a string in a static field,” Teoret. Mat. Fiz. 33 no. 2, (1977) 272–275. MR0456130

[60] L. D. Faddeev and P. P. Kulish, “Quantization of particle-like solutions in field theory,” in Mathematical problems in theoretical physics (Proc. Internat. Conf., Univ. Rome, Rome, 1977), vol. 80 of Lecture Notes in Phys., pp. 270–278. Springer, Berlin-New York, 1978. MR518440

[61] V. S. Gerdzhikov and P. P. Kulish, “Completely integrable Hamiltonian systems connected with a nonselfadjoint Dirac operator,” Bulgar. J. Phys. 5 no. 4, (1978) 337–348. MR520578

[62] P. P. Kulish, “Factorization of scattering characteristics and integrals of motion,” in Nonlinear evolution equations solvable by the spectral transform (Internat. Sympos., Accad. Lincei, Rome, 1977), vol. 26 of Res. Notes in Math., pp. 252–257. Pitman, Boston, Mass.-London, 1978. MR521014

[63] A. G. Izergin and P. P. Kulish, “A massive Thirring model with field values in the Grassmann algebra,” Zap. Nauchn. Sem. Leningrad. Otdel. Mat. Inst. Steklov. (LOMI) 77 (1978) 76–83, 230. Questions in quantum field theory and statistical physics. MR541695

[64] A. G. Izergin and P. P. Kulish, “On the inverse scattering method for the classical massive Thirring model with anticommuting variables,” Lett. Math. Phys. 2 (1978) 297–302.

[65] M. Chaichian and P. P. Kulish, “On the method of inverse scattering problem and Bäcklund transformations for supersymmetric equations,” Phys. Lett. B 78 (1978) 413.

[66] P. P. Kulish, “Infrared divergences of a quantized gravitational field,” Zap. Nauchn. Sem. Leningrad. Otdel. Mat. Inst. Steklov. (LOMI) 77 (1978) 106–123, 230–231. Questions in quantum field theory and statistical physics. MR541697

[67] P. P. Kulish and V. N. Popov, “Infrared asymptotic behavior of the Green function of massive particles in a charge-symmetric model,” Zap. Nauchn. Sem. Leningrad. Otdel. Mat. Inst. Steklov. (LOMI) 77 (1978) 124–133, 231. Questions in quantum field theory and statistical physics. MR541698
[68] P. P. Kulish and A. G. Reyman, “The hierarchy of symplectic forms for the Schrödinger equation and for the Dirac equation,” Zap. Nauchn. Sem. Leningrad. Otdel. Mat. Inst. Steklov. (LOMI) 77 (1978) 134–147, 231. Questions in quantum field theory and statistical physics. MR541699

[69] V. S. Gerdzhikov and P. P. Kulish, “Derivation of the Bäcklund transformation in the formalism of the inverse scattering problem,” Teoret. Mat. Fiz. 39 no. 1, (1979) 69–74. MR536467

[70] P. P. Kulish and E. K. Sklyanin, “Solutions of the Yang-Baxter equation,” Zap. Nauch. Sem. LOMI 95 (1980) 129–160. Jour. Sov. Math. 19 No 5 (1982) 1596.

[71] P. P. Kulish and E. K. Sklyanin, “Quantum inverse scattering method and the Heisenberg ferromagnet,” Phys. Lett. A 70 no. 5-6, (1979) 461–463. http://dx.doi.org/10.1016/0375-9601(79)90365-7 MR588129

[72] P. P. Kulish, “Generalized Bethe ansatz and quantum inverse problem method (in Russian).” (Steklov Math. Inst., Leningrad), LOMI-P-3-79, April 1979, 16pp.

[73] P. P. Kulish, “Generating operators for integrable nonlinear evolution equations,” Zap. Nauchn. Sem. Leningrad. Otdel. Mat. Inst. Steklov. (LOMI) 96 (1980) 105–112, 307–308. Boundary value problems of mathematical physics and related questions in the theory of functions, 12. MR579477

[74] V. S. Gerdjikov, P. P. Kulish, and M. I. Ivanov, “Classical and quantum aspects of the inverse scattering method,” in Mathematical problems in theoretical physics (Proc. Internat. Conf. Math. Phys., Lausanne, 1979), vol. 116 of Lecture Notes in Phys., pp. 244–248. Springer, Berlin-New York, 1980. MR582629

[75] A. G. Izergin and P. P. Kulish, “Inverse problem for systems with anticommuting variables and the massive Thirring model,” Teoret. Mat. Fiz. 44 no. 2, (1980) 189–193. MR587299

[76] V. S. Gerdzhikov, M. I. Ivanov, and P. P. Kulish, “Quadratic pencils and nonlinear equations,” Teoret. Mat. Fiz. 44 no. 3, (1980) 342–357. MR596207

[77] P. P. Kulish, “Multicomponent nonlinear Schrödinger equation with grading,” Dokl. Akad. Nauk SSSR 255 no. 2, (1980) 323–326. MR612869

[78] V. S. Gerdzhikov, M. I. Ivanov, and P. P. Kulish, “Complete integrability of the difference evolution equations.” JINR-E2-80-882, Dec 1980, 20pp, submitted to Rept. Math. Phys.

[79] L. D. Faddeev and P. P. Kulish, “Development of the quantum inverse problem method (abstract only).” Chania 1980, Proceedings, Nonlinear Evolution Equations and Dynamical Systems, 21.

[80] P. P. Kulish and S. A. Cypljaev, “Supersymmetric cos Φ2 model and the inverse problem method,” Teoret. Mat. Fiz. 46 no. 2, (1981) 172–186. MR612953
[81] V. S. Gerdzhikov and P. P. Kulish, “Expansion in “squares” of eigenfunctions of a matrix linear system,” *Zap. Nauchn. Sem. Leningrad. Otdel. Mat. Inst. Steklov. (LOMI)* **101** (1981) 46–63, 206. Questions in quantum field theory and statistical physics, 2. MR623924

[82] P. P. Kulish and N. Y. Reshetikhin, “Quantum linear problem for the sine-Gordon equation and higher representations,” *Zap. Nauchn. Sem. Leningrad. Otdel. Mat. Inst. Steklov. (LOMI)* **101** (1981) 101–110, 207. Questions in quantum field theory and statistical physics, 2. MR623928

[83] P. P. Kulish, “Quantum difference nonlinear Schrödinger equation,” *Lett. Math. Phys.* **5** no. 3, (1981) 191–197. [http://dx.doi.org/10.1007/BF00420698](http://dx.doi.org/10.1007/BF00420698) MR624761

[84] P. P. Kulish and E. K. Sklyanin, “O(N)-invariant nonlinear Schrödinger equation—a new completely integrable system,” *Phys. Lett. A* **84** no. 7, (1981) 349–352. [http://dx.doi.org/10.1016/0375-9601(81)90205-X](http://dx.doi.org/10.1016/0375-9601(81)90205-X) MR628604

[85] P. P. Kulish, “Realization of the Zamolodchikov-Faddeev algebra,” *Zap. Nauchn. Sem. Leningrad. Otdel. Mat. Inst. Steklov. (LOMI)* **109** (1981) 83–92, 181, 183. Differential geometry, Lie groups and mechanics, IV. MR629116

[86] V. S. Gerdjikov and P. P. Kulish, “The generating operator for the $n \times n$ linear system,” *Phys. D* **3** no. 3, (1981) 549–564. [http://dx.doi.org/10.1016/0167-2789(81)90039-7](http://dx.doi.org/10.1016/0167-2789(81)90039-7) MR631186

[87] P. P. Kulish and N. Y. Reshetikhin, “Generalized Heisenberg ferromagnet and the Gross-Neveu model,” *Sov. Phys. JETP* no. 53 (1), (1981) 108–114. Zh. Eksp. Fiz. 80 (1981), 214-228.

[88] P. P. Kulish, N. Y. Reshetikhin, and E. K. Sklyanin, “Yang-Baxter equations and representation theory. I,” *Lett. Math. Phys.* **5** no. 5, (1981) 393–403. [http://dx.doi.org/10.1007/BF02285311](http://dx.doi.org/10.1007/BF02285311) MR649704

[89] P. P. Kulish and S. A. Tsyplyaev, “Calculation of the Poisson brackets of scattering data in the inverse problem method,” in Generalized functions and their applications in mathematical physics (Moscow, 1980), pp. 309–315. Akad. Nauk SSSR, Vychisl. Tsentr, Moscow, 1981. MR681524

[90] P. P. Kulish, “Quantum inverse problem method and exactly solvable models of statistical physics.”. Proceedings, II International Symposium on Selected Topics in Statistical Mechanics, Dubna (1981) 147-157.

[91] P. P. Kulish, “Classical and quantum inverse problem method and generalized Bethe ansatz,” *Physica D* **3** no. 1-2, (1981) 246–257. ISI:A1981MH77800015

[92] P. P. Kulish, “Action-angle variables for a multicomponent nonlinear Schrödinger equation,” *Zap. Nauchn. Sem. Leningrad. Otdel. Mat. Inst. Steklov. (LOMI)* **115** (1982) 126–136, 308. Boundary value problems of mathematical physics and related questions in the theory of functions, 14. MR660077
[93] P. P. Kulish, “Correction,” Physics Letters A 88 no. 9, (1982) 491. ISI:A1982NN06800015

[94] P. P. Kulish and F. A. Smirnov, “Quantum inverse problem and Green functions for the Heisenberg ferromagnet,” Phys. Lett. A 90 no. 1-2, (1982) 74–78 http://dx.doi.org/10.1016/0375-9601(82)90055-X MR664161

[95] P. P. Kulish and E. K. Sklyanin, “Quantum spectral transform method. Recent developments,” vol. 151 of Lecture Notes in Phys., pp. 61–119. Springer, Berlin-New York, 1982. MR671263

[96] N. V. Borisov and P. P. Kulish, “Path integral in superspace for a relativistic spinor particle in an external gauge field,” Teoret. Mat. Fiz. 51 no. 3, (1982) 335–343. MR674783

[97] P. P. Kulish, “Path integral in superspace (in Russian).” Sukhumi 1982, Proceedings, Quarks-82, 166-170.

[98] P. P. Kulish and N. Y. Reshetikhin, “On GL_3-invariant solutions of the Yang-Baxter equation and associated quantum systems,” Zap. Nauchn. Sem. Leningrad. Otdel. Mat. Inst. Steklov. (LOMI) 120 (1982) 92–121. Questions in quantum field theory and statistical physics, 3. MR701555

[99] P. P. Kulish and S. A. Tsyplyaev, “Complete integrability of the supersymmetric model (cos φ),” Zap. Nauchn. Sem. Leningrad. Otdel. Mat. Inst. Steklov. (LOMI) 120 (1982) 122–135. Questions in quantum field theory and statistical physics, 3. MR701556

[100] P. P. Kulish and A. G. Reyman, “Hamiltonian structure of polynomial bundles,” Zap. Nauchn. Sem. Leningrad. Otdel. Mat. Inst. Steklov. (LOMI) 123 (1983) 67–76. Differential geometry, Lie groups and mechanics, V. MR697242

[101] A. P. Fordy and P. P. Kulish, “Nonlinear Schrödinger equations and simple Lie algebras,” Comm. Math. Phys. 89 no. 3, (1983) 427–443. http://projecteuclid.org/euclid.cmp/1103922818 MR709476

[102] V. S. Gerdzhikov and P. P. Kulish, “The multicomponent nonlinear Schrödinger equation in the case of nonzero boundary conditions,” Zap. Nauchn. Sem. Leningrad. Otdel. Mat. Inst. Steklov. (LOMI) 131 (1983) 34–46. Questions in quantum field theory and statistical physics, 4. MR718678

[103] P. P. Kulish, “Quantum inverse scattering method for multicomponent systems.”. Autoreferat of Doctor of Science Thesis, Steklov Mathematical Institute, Moscow 1983, 21pp.

[104] P. P. Kulish and N. Y. Reshetikhin, “Diagonalisation of GL(N) invariant transfer matrices and quantum N-wave system (Lee model),” J. Phys. A 16 no. 16, (1983) L591–L596. http://stacks.iop.org/0305-4470/16/L591 MR727044
[105] V. S. Gerdzhikov, M. I. Ivanov, and P. P. Kulish, “Expansions over the “squared” solutions and difference evolution equations,” *J. Math. Phys.* **25** no. 1, (1984) 25–34. [http://dx.doi.org/10.1063/1.525994](http://dx.doi.org/10.1063/1.525994) MR728883

[106] P. P. Kulish and N. Y. Reshetikhin, “Integrable fermion chiral models connected with classical Lie algebras,” *Zap. Nauchn. Sem. Leningrad. Otdel. Mat. Inst. Steklov. (LOMI)* **133** (1984) 146–159. Differential geometry, Lie groups and mechanics, VI.

[107] P. P. Kulish, “Quantum osp-invariant nonlinear Schrödinger equation,” *Lett. Math. Phys.* **10** no. 1, (1985) 87–93. [http://dx.doi.org/10.1007/BF00704591](http://dx.doi.org/10.1007/BF00704591) MR797004

[108] P. P. Kulish, “Quantum spectral transform,” in *Critical phenomena (Brașov, 1983)*, vol. 11 of *Progr. Phys.*, pp. 351–374. Birkhäuser Boston, Boston, MA, 1985. MR825250

[109] S. I. Alishauskas and P. P. Kulish, “Spectral expansion of SU(3)-invariant solutions of the Yang-Baxter equation,” *Zap. Nauchn. Sem. Leningrad. Otdel. Mat. Inst. Steklov. (LOMI)* **145** no. Voprosy Kvant. Teor. Polya i Statist. Fiz. 5, (1985) 3–21, 189, 193. MR857958

[110] P. P. Kulish, “Integrable graded magnets,” *Zap. Nauchn. Sem. Leningrad. Otdel. Mat. Inst. Steklov. (LOMI)* **145** no. Voprosy Kvant. Teor. Polya i Statist. Fiz. 5, (1985) 140–163, 191, 195. MR857967

[111] P. P. Kulish, “Solitons and representation theory,” in *Problems of nonlinear and turbulent processes in physics, Part 1 (Russian) (Kiev, 1983)*, pp. 53–59. “Naukova Dumka”, Kiev, 1985. MR890151

[112] P. P. Kulish and F. A. Smirnov, “Anisotropic Heisenberg-ferromagnet with a ground-state of the domain-wall type,” *Journal of Physics C Solid State Physics*. ISI:A1985ACK0600011

[113] P. P. Kulish, “Quantum nonlinear wave interaction system,” *Phys. D* **18** no. 1-3, (1986) 360–364. [http://dx.doi.org/10.1016/0167-2789(86)90197-1](http://dx.doi.org/10.1016/0167-2789(86)90197-1) Solitons and coherent structures (Santa Barbara, Calif., 1985). MR838342

[114] P. P. Kulish and F. A. Smirnov, “Equations of the inverse problem of the quantum three-wave system,” *Zap. Nauchn. Sem. Leningrad. Otdel. Mat. Inst. Steklov. (LOMI)* **150** no. Voprosy Kvant. Teor. Polya i Statist. Fiz. 6, (1986) 53–69, 220. [http://dx.doi.org/10.1007/BF01099191](http://dx.doi.org/10.1007/BF01099191) MR861261

[115] P. P. Kulish, “An analogue of the Korteweg-de Vries equation for the superconformal algebra,” *Zap. Nauchn. Sem. Leningrad. Otdel. Mat. Inst. Steklov. (LOMI)* **155** no. Differentsial’naya Geometriya, Gruppy Li i Mekh. VIII, (1986) 142–149, 194. [http://dx.doi.org/10.1007/BF01247091](http://dx.doi.org/10.1007/BF01247091) MR869580

[116] P. P. Kulish, “Integrable models of field theory and simple Lie algebras and superalgebras,” in *Group theoretical methods in physics, Vol. I (Yurmala, 1985)*, pp. 299–305. VNU Sci. Press, Utrecht, 1986. MR919751
[117] P. P. Kulish, “Integrable models in field theory, and simple Lie algebras and Lie superalgebras,” in Group-theoretic methods in physics, Vol. 1 (Russian) (Jūrmala, 1985), pp. 412–417. “Nauka”, Moscow, 1986. MR946845

[118] P. P. Kulish, “Algebraic and Hamiltonian methods in the theory of nonabelian anomalies (abstract only).” Espoo 1986, Proceedings, Topological and geometrical methods in field theory, 341.

[119] M. Chaichian and P. P. Kulish, “Superconformal algebras and their relation to integrable nonlinear systems,” Phys. Lett. B 183 no. 2, (1987) 169–174. http://dx.doi.org/10.1016/0370-2693(87)90432-1 MR874098

[120] P. P. Kulish and V. D. Lipovskii, “Hamiltonian interpretation of the inverse problem method for the Davey-Stewartson equation,” Zap. Nauchn. Sem. Leningrad. Otdel. Mat. Inst. Steklov. (LOMI) 161 no. Vopr. Kvant. Teor. Polya i Statist. Fiz. 7, (1987) 54–71, 176, 179. http://dx.doi.org/10.1007/BF01096091 MR918753

[121] P. P. Kulish and M. A. Sokolov, “On scattering theory in the massless Lee model,” Teoret. Mat. Fiz. 73 no. 1, (1987) 149–153. MR939802

[122] P. P. Kulish, V. D. Lipovskii, and A. V. Shirokov, “Scattering data for the nonstationary Dirac equation,” Zap. Nauchn. Sem. Leningrad. Otdel. Mat. Inst. Steklov. (LOMI) 164 no. Differentsial’naya Geom. Gruppy Li i Mekh. IX, (1987) 169–175, 199. http://dx.doi.org/10.1007/BF01840430 MR947336

[123] P. P. Kulish and V. D. Lipovsky, “Hamiltonian structure of the Davey-Stewartson equation and Poisson brackets of scattering data,” Phys. Lett. A 127 no. 8-9, (1988) 413–417. http://dx.doi.org/10.1016/0375-9601(88)90206-X MR933023

[124] P. P. Kulish, “The quantum superalgebra osp(2|1),” Zap. Nauchn. Sem. Leningrad. Otdel. Mat. Inst. Steklov. (LOMI) 169 no. Voprosy Kvant. Teor. Polya i Statist. Fiz. 8, (1988) 95–106, 188. http://dx.doi.org/10.1007/BF01101123 MR976813

[125] P. P. Kulish and N. Y. Reshetikhin, “Universal R-matrix of the quantum superalgebra osp(2|1),” Lett. Math. Phys. 18 no. 2, (1989) 143–149. http://dx.doi.org/10.1007/BF00401868 MR1010993

[126] P. P. Kulish, “Quantum Lie superalgebras and supergroups,” in Problems of modern quantum field theory (Alushta, 1989), Res. Rep. Phys., pp. 14–21. Springer, Berlin, 1989. MR1091758

[127] M. Chaichian and P. Kulish, “Quantum Lie superalgebras and q-oscillators,” Phys. Lett. B 234 no. 1-2, (1990) 72–80. http://dx.doi.org/10.1016/0370-2693(90)92004-3 MR1036959

[128] P. P. Kulish and E. V. Damaskinsky, “On the q oscillator and the quantum algebra su_q(1,1),” J. Phys. A 23 no. 9, (1990) L415–L419. http://stacks.iop.org/0305-4470/23/L415 MR1048775
[129] M. Chaichian, P. Kulish, and J. Lukierski, “q-deformed Jacobi identity, q-oscillators and q-deformed infinite-dimensional algebras,” *Phys. Lett. B* 237 no. 3-4, (1990) 401–406. [http://dx.doi.org/10.1016/0370-2693(90)91196-I](http://dx.doi.org/10.1016/0370-2693(90)91196-I). MR1063456

[130] P. P. Kulish, “Clebsch-Gordan coefficients for a quantum superalgebra of rank one. I,” *Zap. Nauchn. Sem. Leningrad. Otdel. Mat. Inst. Steklov. (LOMI)* 180 no. Voprosy Kvant. Teor. Polya i Statist. Fiz. 9, (1990) 76–88, 180. [http://dx.doi.org/10.1007/BF01249334](http://dx.doi.org/10.1007/BF01249334). MR1067335

[131] P. P. Kulish, “A two-parameter quantum group and a gauge transformation,” *Zap. Nauchn. Sem. Leningrad. Otdel. Mat. Inst. Steklov. (LOMI)* 180 no. Voprosy Kvant. Teor. Polya i Statist. Fiz. 9, (1990) 89–93, 180. [http://dx.doi.org/10.1007/BF01249335](http://dx.doi.org/10.1007/BF01249335). MR1067336

[132] M. Chaichian, D. Ellinas, and P. Kulish, “Quantum algebra as the dynamical symmetry of the deformed Jaynes-Cummings model,” *Phys. Rev. Lett.* 65 no. 8, (1990) 980–983. [http://dx.doi.org/10.1103/PhysRevLett.65.980](http://dx.doi.org/10.1103/PhysRevLett.65.980). MR1067477

[133] M. Boiti, P. Kulish, and F. Pempinelli, “Scattering of wall solitons in 2 + 1 dimensions,” *Phys. D* 44 no. 3, (1990) 557–564. [http://dx.doi.org/10.1016/0167-2789(90)90161-H](http://dx.doi.org/10.1016/0167-2789(90)90161-H). MR1076342

[134] P. P. Kulish, “Contraction of quantum algebras, and q-oscillators,” *Teoret. Mat. Fiz.* 86 no. 1, (1991) 157–160. [http://dx.doi.org/10.1007/BF01018504](http://dx.doi.org/10.1007/BF01018504). MR1106831

[135] E. V. Damaskinsky and P. P. Kulish, “Deformed oscillators and their applications,” *Zap. Nauchn. Sem. Leningrad. Otdel. Mat. Inst. Steklov. (LOMI)* 189 no. Voprosy Kvant. Teor. Polya i Statist. Fiz. 10, (1991) 37–74, 183. [http://dx.doi.org/10.1007/BF01097496](http://dx.doi.org/10.1007/BF01097496). MR1111675

[136] M. Chaichian, P. Kulish, and J. Lukierski, “Supercovariant systems of q-oscillators and q-supersymmetric Hamiltonians,” *Phys. Lett. B* 262 no. 1, (1991) 43–48. [http://dx.doi.org/10.1016/0370-2693(91)90640-C](http://dx.doi.org/10.1016/0370-2693(91)90640-C). MR1114273

[137] P. P. Kulish and E. K. Sklyanin, “The general $U_q[sl(2)]$ invariant XXZ integrable quantum spin chain,” *J. Phys. A* 24 no. 8, (1991) L435–L439. [http://stacks.iop.org/0305-4470/24/L435](http://stacks.iop.org/0305-4470/24/L435). MR1117592

[138] P. P. Kulish, “Quantum algebras and symmetries of dynamical systems,” in *Group theoretical methods in physics (Moscow, 1990)*, vol. 382 of *Lecture Notes in Phys.*, pp. 195–198. Springer, Berlin, 1991. [http://dx.doi.org/10.1007/3-540-54040-7_106](http://dx.doi.org/10.1007/3-540-54040-7_106). MR1140211

[139] E. Celeghini, R. Giachetti, P. P. Kulish, E. Sorace, and M. Tarlini, “Hopf superalgebra contractions and $R$-matrix for fermions,” *J. Phys. A* 24 no. 24, (1991) 5675–5682. [http://stacks.iop.org/0305-4470/24/5675](http://stacks.iop.org/0305-4470/24/5675). MR1142025
[140] M. Chaichian, P. Kulish, and J. Lukierski, “Supercovariant $q$-oscillators,” in *Nonlinear fields: classical, random, semiclassical (Karpacz, 1991)*, pp. 336–345. World Sci. Publ., River Edge, NJ, 1991. MR1146012

[141] P. P. Kulish, “Finite-dimensional Zamolodchikov-Faddeev algebra and $q$-oscillators,” *Phys. Lett. A* **161** no. 1, (1991) 50–52. [http://dx.doi.org/10.1016/0375-9601(91)90543-H](http://dx.doi.org/10.1016/0375-9601(91)90543-H) MR1146146

[142] M. Chaichian and P. Kulish, “Quantum superalgebras, $q$-oscillators and applications,” in *Nonperturbative methods in low-dimensional quantum field theories (Debrecen, 1990)*, pp. 213–236. World Sci. Publ., River Edge, NJ, 1991. MR1191204

[143] E. V. Damaskinsky and P. P. Kulish, “Hermite $q$-polynomials and $q$-oscillators,” *Zap. Nauchn. Sem. S.-Peterburg. Otdel. Mat. Inst. Steklov. (POMI)* **199** no. Voprosy Kvant. Teor. Polya Statist. Fiz. 11, (1992) 81–90, 185–186 [http://dx.doi.org/10.1007/BF02367234](http://dx.doi.org/10.1007/BF02367234) MR1168674

[144] K. Hikami, P. P. Kulish, and M. Wadati, “Construction of integrable spin systems with long-range interactions,” *J. Phys. Soc. Japan* **61** no. 9, (1992) 3071–3076 [http://dx.doi.org/10.1143/JPSJ.61.3071](http://dx.doi.org/10.1143/JPSJ.61.3071) MR1191263

[145] P. P. Kulish and E. K. Sklyanin, “Algebraic structures related to reflection equations,” *J. Phys. A* **25** no. 22, (1992) 5963–5975. [http://stacks.iop.org/0305-4470/25/5963](http://stacks.iop.org/0305-4470/25/5963) MR1193836

[146] P. P. Kulish, “Quantum algebras, $q$-deformed oscillators and related topics,” in *Quantum group and quantum integrable systems*, Nankai Lectures Math. Phys., pp. 99–131. World Sci. Publ., River Edge, NJ, 1992. MR1239669

[147] K. Hikami, P. P. Kulish, and M. Wadati, “Integrable spin systems with long-range interactions,” *Chaos Solitons Fractals* **2** no. 5, (1992) 543–550. [http://dx.doi.org/10.1016/0960-0779(92)90029-M](http://dx.doi.org/10.1016/0960-0779(92)90029-M) MR1295926

[148] P. P. Kulish, “Deformed oscillators, non-commutative geometry, Yang-Baxter and reflection equations.”. Proceedings of XXI-DGMTP Conference, Tianjin, 1992, 10 pp.

[149] P. P. Kulish, “Quantum groups - proceedings of workshops held in the Euler-International-Mathematical-Institute, Leningrad, Fall 1990 - preface,” in *Quantum Groups*, Kulish, P. P., ed., vol. 1510 of *Lecture notes in mathematics*, p. R7, Euler Int Math Inst. 1992. ISI:A1992BX67H00002

[150] P. P. Kulish, R. Sasaki, and C. Schwiebert, “Constant solutions of reflection equations and quantum groups,” *J. Math. Phys.* **34** no. 1, (1993) 286–304. [http://dx.doi.org/10.1063/1.530382](http://dx.doi.org/10.1063/1.530382) MR1198638

[151] P. P. Kulish, “On recent progress in quantum groups: an introductory review,” in *Jahrbuch Überblicke Mathematik, 1993*, pp. 97–124. Friedr. Vieweg, Braunschweig, 1993. MR1208109
[152] P. P. Kulish and R. Sasaki, “Covariance properties of reflection equation algebras,” Progr. Theoret. Phys. 89 no. 3, (1993) 741–761. http://dx.doi.org/10.1143/PTP.89.741 MR1215910

[153] P. P. Kulish, “Quantum groups, $Q$-oscillators and covariant algebras,” Teoret. Mat. Fiz. 94 no. 2, (1993) 193–199. http://dx.doi.org/10.1007/BF01019325. MR1221730

[154] P. P. Kulish, “Quantum groups and dynamical systems,” in Proceedings of the International Symposium on Quantum Physics and the Universe (Tokyo, 1992), vol. 37, pp. 67–76. 1993. http://dx.doi.org/10.1016/0083-6656(93)90009-9 MR1226066

[155] M. Chaichian, J. F. Gomes, and P. Kulish, “Operator formulation of $q$-deformed dual string model,” Phys. Lett. B 311 no. 1-4, (1993) 93–97. http://dx.doi.org/10.1016/0370-2693(93)90539-T MR1230818

[156] P. P. Kulish, “Covariant noncommutative differential geometry,” Zap. Nauchn. Sem. S.-Peterburg. Otdel. Mat. Inst. Steklov. (POMI) 205 no. Differential'naia Geom. Gruppy Li i Mekh. 13, (1993) 85–91, 20, 180. http://dx.doi.org/10.1007/BF02362779 MR1255305

[157] P. P. Kulish, “Reflection equation algebras and quantum groups,” in Quantum and non-commutative analysis (Kyoto, 1992), vol. 16 of Math. Phys. Stud., pp. 207–220. Kluwer Acad. Publ., Dordrecht, 1993. MR1276292

[158] P. P. Kulish, “Quantum groups and quantum algebras as symmetries of dynamical systems,” in Quantum symmetries (Clausthal, 1991), pp. 51–74. World Sci. Publ., River Edge, NJ, 1993. MR1339517

[159] P. P. Kulish, S. Rauch-Wojciechowski, and A. V. Tsiganov, “Restricted flows of the KdV hierarchy and $r$-matrix formalism,” Modern Phys. Lett. A 9 no. 22, (1994) 2063–2073. http://dx.doi.org/10.1142/S0217732394001921 MR1290288

[160] P. P. Kulish, “Representations of $q$-Minkowski space algebra,” Algebra i Analiz 6 no. 2, (1994) 195–205. MR1290824

[161] J. A. de Azcárraga, P. P. Kulish, and F. Ródenas, “Reflection equations and $q$-Minkowski space algebras,” Lett. Math. Phys. 32 no. 3, (1994) 173–182. http://dx.doi.org/10.1007/BF00750660 MR1299034

[162] J. A. de Azcárraga, P. P. Kulish, and F. Ródenas, “Non-commutative geometry and covariance: from the quantum plane to quantum tensors,” Czechoslovak J. Phys. 44 no. 11-12, (1994) 981–991. http://dx.doi.org/10.1007/BF01690450 Quantum groups and physics (Prague, 1994). MR1313739

[163] J. A. de Azcárraga, P. P. Kulish, and F. Ródenas, “Non-commutative geometry and covariance: from the quantum plane to quantum tensors.”. Preprint FTUV-94-54,
[164] P. P. Kulish, “Quantum groups and quantum homogeneous spaces.”. Proceedings of XXI-International Symposium on Elementary Particle Theory, DESY, Wendish-Rietz, 1993, 8pp; Preprint DESY 94-053 (1994).

[165] J. A. de Azcárraga, P. P. Kulish, and F. Ródenas, “On the physical contents of \(q\)-deformed Minkowski spaces,” [Phys. Lett. B 351 no. 1-3, (1995) 123–130]. http://dx.doi.org/10.1016/0370-2693(95)00359-S MR1335177

[166] Y. S. Osipov, A. A. Gonchar, S. P. Novikov, V. I. Arnol’d, G. I. Marchuk, P. P. Kulish, V. S. Vladimirov, and E. F. Mishchenko, “Lyudvig Dmitrievich Faddeev (on the occasion of his sixtieth birthday),” [Uspekhi Mat. Nauk 50 no. 3(303), (1995) 171–186] http://dx.doi.org/10.1070/RM1995v050n03ABEH002577 MR1349334

[167] E. V. Damaskinsky, P. P. Kulish, and M. A. Sokolov, “Gauss decompositions of quantum groups and supergroups,” [Zap. Nauchn. Sem. S.-Peterburg. Otdel. Mat. Inst. Steklov. (POMI) 224 no. Voprosy Kvant. Teor. Polya i Statist. Fiz. 13, (1995) 155–177, 338] http://dx.doi.org/10.1007/BF02364982 MR1364848

[168] J. A. de Azcárraga, P. P. Kulish, and F. Rodenas, “Dirac-like formulation of \(q\)-Lorentz groups,” in Group theoretical methods in physics (Toyonaka, 1994), pp. 133–137. World Sci. Publ., River Edge, NJ, 1995. MR1413741

[169] J. A. de Azcárraga, P. P. Kulish, and F. Rodenas, “Quantum groups and deformed special relativity,” [Fortschr. Phys. 44 no. 1, (1996) 1–40] http://dx.doi.org/10.1002/prop.2190440102 MR1390845

[170] P. P. Kulish, S. Rauch-Wojciechowski, and A. V. Tsiganov, “Stationary problems for equation of the KdV type and dynamical \(r\)-matrices,” [J. Math. Phys. 37 no. 7, (1996) 3463–3482] http://dx.doi.org/10.1063/1.531575 MR1401235

[171] P. P. Kulish, “Quantum group covariant algebras,” in Quantum groups and their applications in physics (Varenna, 1994), vol. 127 of Proc. Internat. School Phys. Enrico Fermi, pp. 203–214. IOS, Amsterdam, 1996. MR1415854

[172] M. Chaichian and P. P. Kulish, “Quantum group covariant systems,” in From field theory to quantum groups, pp. 99–111. World Sci. Publ., River Edge, NJ, 1996. http://dx.doi.org/10.1142/9789812830425_0006 MR1428436

[173] P. P. Kulish, “Yang-Baxter equation and reflection equations in integrable models,” in Low-dimensional models in statistical physics and quantum field theory (Schladming, 1995), vol. 469 of Lecture Notes in Phys., pp. 125–144. Springer, Berlin, 1996. http://dx.doi.org/10.1007/BFb0102555 MR1477944

[174] E. V. Damaskinsky, P. P. Kulish, V. D. Lyakhovsky, and M. A. Sokolov, “Gauss decomposition for quantum groups and duality,” in Symmetry methods in physics,
[175] P. P. Kulish, “Comment on q-oscillator coherent states.”. Preprint KTH-96-31, Stockholm, 1996, 4pp.

[176] P. P. Kulish, “Quantum integrable systems.”. Lecture course, Royal Institute of Technology, Physics Department, Stockholm, 1996.

[177] E. V. Damaskinsky and P. P. Kulish, “Irreducible representations of deformed oscillator algebra and q-special functions,” *Internat. J. Modern Phys. A* **12** no. 1, (1997) 153–158. [http://dx.doi.org/10.1142/S0217751X97000207](http://dx.doi.org/10.1142/S0217751X97000207) IWCQIS 96 (Dubna, 1996). MR1446986

[178] A. P. Isaev and P. P. Kulish, “Tetrahedron reflection equations,” *Modern Phys. Lett. A* **12** no. 6, (1997) 427–437. [http://dx.doi.org/10.1142/S0217732397000443](http://dx.doi.org/10.1142/S0217732397000443) MR1449302

[179] A. Stolin and P. P. Kulish, “New rational solutions of Yang-Baxter equation and deformed Yangians,” *Czechoslovak J. Phys.* **47** no. 1, (1997) 123–129. [http://dx.doi.org/10.1023/A:1021460515598](http://dx.doi.org/10.1023/A:1021460515598) Quantum groups and integrable systems, II (Prague, 1996). MR1454689

[180] M. Chaichian, A. P. Demichev, and P. P. Kulish, “Quasi-classical limit in q-deformed systems, non-commutativity and the q-path integral,” *Phys. Lett. A* **233** no. 4-6, (1997) 251–260. [http://dx.doi.org/10.1016/S0375-9601(97)00513-6](http://dx.doi.org/10.1016/S0375-9601(97)00513-6) MR1474459

[181] J. A. de Azcárraga, P. P. Kulish, and F. Rodenas, “Twisted h-spacetimes and invariant equations,” *Z. Phys. C* **76** no. 3, (1997) 567–576. [http://dx.doi.org/10.1007/s002880050579](http://dx.doi.org/10.1007/s002880050579) MR1483888

[182] P. P. Kulish and A. A. Stolin, “Deformed Yangians and integrable models,” *Czechoslovak J. Phys.* **47** no. 12, (1997) 1207–1212. [http://dx.doi.org/10.1023/A:1022869414679](http://dx.doi.org/10.1023/A:1022869414679) Quantum groups and integrable systems, II (Prague, 1997). MR1608809

[183] P. N. Bibikov and P. P. Kulish, “Dirac operators on the quantum group SUq(2) and the quantum sphere,” *Zap. Nauchn. Sem. S.-Peterburg. Otdel. Mat. Inst. Steklov.* (POMI) **245** no. Vopr. Kvant. Teor. Polya i Stat. Fiz. 14, (1997) 49–65, 283. [http://dx.doi.org/10.1007/BF02675726](http://dx.doi.org/10.1007/BF02675726) MR1627837

[184] P. P. Kulish, “Quantum groups and their representations.”. Lecture course, Department of Mathematics, Royal Institute of Technology, Stockholm, 1997.

[185] E. Celegghini and P. P. Kulish, “Twist deformation of the rank-one Lie superalgebra,” *J. Phys. A* **31** no. 4, (1998) L79–L84. [http://dx.doi.org/10.1088/0305-4470/31/4/001](http://dx.doi.org/10.1088/0305-4470/31/4/001) MR1627540
[186] P. P. Kulish and V. D. Lyakhovsky, “Classical and quantum duality in Jordanian quantizations,” Czechoslovak J. Phys. 48 no. 11, (1998) 1415–1421. [http://dx.doi.org/10.1023/A:1021613407866] Quantum groups and integrable systems (Prague, 1998). MR1681992

[187] E. V. Damaskinsky, P. P. Kulish, and M. Chaï chian, “Dynamical systems associated with the Cremmer-Gervais $R$-matrix,” Teoret. Mat. Fiz. 116 no. 1, (1998) 101–112. [http://dx.doi.org/10.1007/BF02557124] MR1700692

[188] P. P. Kulish and M. A. Sokolov, “Gauss decomposition of quantum groups and a model of discrete dynamics,” Zap. Nauchn. Sem. S.-Peterburg. Otdel. Mat. Inst. Steklov. (POMI) 251 no. Vopr. Kvant. Teor. Polya i Stat. Fiz. 15, (1998) 105–114, 275–276 (1999). [http://dx.doi.org/10.1023/A:1011301007755] MR1737872

[189] P. P. Kulish, “Twisting of quantum groups and integrable models,” in Particles, fields, and gravitation (Lódz, 1998), vol. 453 of AIP Conf. Proc., pp. 75–85. Amer. Inst. Phys., Woodbury, NY, 1998. MR1765492

[190] P. P. Kulish and A. I. Mudrov, “Universal $R$-matrix for esoteric quantum groups,” Lett. Math. Phys. 47 no. 2, (1999) 139–148. [http://dx.doi.org/10.1023/A:1007538903995] MR1682301

[191] P. P. Kulish, V. D. Lyakhovsky, and A. I. Mudrov, “Extended Jordanian twists for Lie algebras,” J. Math. Phys. 40 no. 9, (1999) 4569–4586. [http://dx.doi.org/10.1063/1.532987] MR1708368

[192] P. P. Kulish, “Symmetries related to Yang-Baxter equation and reflection equations,” in Proceedings of the Euroconference on New Symmetries in Statistical Mechanics and Condensed Matter Physics (Torino, 1998), vol. 13, pp. 2943–2951. 1999. [http://dx.doi.org/10.1142/S0217979299002770] MR1719483

[193] P. P. Kulish, “Deformed oscillator and path integrals,” in Path integrals from peV to TeV (Florence, 1998), pp. 217–220. World Sci. Publ., River Edge, NJ, 1999. MR1726595

[194] P. P. Kulish, V. D. Lyakhovsky, and M. A. del Olmo, “Chains of twists for classical Lie algebras,” J. Phys. A 32 no. 49, (1999) 8671–8684. [http://dx.doi.org/10.1088/0305-4470/32/49/308] MR1732615

[195] P. P. Kulish and A. I. Mudrov, “Twist-like geometries on a quantum Minkowski space,” Tr. Mat. Inst. Steklova 226 no. Mat. Fiz. Probl. Kvantovoi Teor. Polya, (1999) 97–111. MR1782555

[196] P. P. Kulish, “Super-Jordanian deformation of the orthosymplectic Lie superalgebras.” Preprint DFF-1998/11, 10p.; Mod. Phys. Lett. (1999) ; math.QA/9806104.
[197] V. V. Borzov, E. V. Damaskinsky, and P. P. Kulish, “Construction of the spectral measure for deformed oscillator position operator in the case of undetermined Hamburger moment problem,” Rev. Math. Phys. 12 no. 5, (2000) 691–710 http://dx.doi.org/10.1142/S0129055X0000023X MR1767500

[198] P. P. Kulish, “Twisting of quantum groups and integrable systems,” in Proceedings of the Workshop on Nonlinearity, Integrability and All That: Twenty Years after NEEDS ’79 (Gallipoli, 1999), pp. 304–310. World Sci. Publ., River Edge, NJ, 2000. MR1772994

[199] P. P. Kulish, “Twisting of quantum groups and integrable models.” Proceed. Lodz Conference: Particles, Fields, and Gravitation; J. Rembielinski (ed), Amer. Inst. Physics, 1998, 75-85.

[200] P. P. Kulish and A. M. Nikitin, “Invariants of B-type links via an extension of the Kauffman bracket,” Zap. Nauchn. Sem. S.-Peterburg. Otdel. Mat. Inst. Steklov. (POMI) 266 no. Teor. Predst. Din. Sist. Komb. i Algoritm. Metody. 5, (2000) 107–130, 338 http://dx.doi.org/10.1023/A:1021982103565 MR1774650

[201] P. P. Kulish and V. D. Lyakhovsky, “Jordanian twists on deformed carrier subspaces,” J. Phys. A 33 no. 31, (2000) L279–L285 http://dx.doi.org/10.1088/0305-4470/33/31/103 MR1784221

[202] P. P. Kulish and A. I. Mudrov, “On twisting solutions to the Yang-Baxter equation,” Czechoslovak J. Phys. 50 no. 1, (2000) 115–122 http://dx.doi.org/10.1023/A:1022885317520 Quantum groups and integrable systems (Prague, 1999). MR1798773

[203] E. V. Damaskinsky and P. P. Kulish, “Symmetries associated with the Yang-Baxter equation and the reflection equation,” Zap. Nauchn. Sem. S.-Peterburg. Otdel. Mat. Inst. Steklov. (POMI) 269 no. Vopr. Kvant. Teor. Polya i Stat. Fiz. 16, (2000) 180–192, 368–369 http://dx.doi.org/10.1023/A:1022699729324 MR1805860

[204] E. V. Damaskinsky, P. P. Kulish, and M. A. Sokolov, “On the structure of co-boundary R-matrices of classical series,” Zap. Nauchn. Sem. S.-Peterburg. Otdel. Mat. Inst. Steklov. (POMI) 269 no. Vopr. Kvant. Teor. Polya i Stat. Fiz. 16, (2000) 193–206, 369 http://dx.doi.org/10.1023/A:1022651813395 MR1805861

[205] P. P. Kulish, V. D. Lyakhovsky, and A. Stolin, “Full chains of twists for orthogonal algebras,” Czechoslovak J. Phys. 50 no. 11, (2000) 1291–1296 http://dx.doi.org/10.1023/A:1022873326934 Quantum groups and integrable systems (Prague, 2000). MR1806276

[206] P. P. Kulish and N. Manojlović, “Bethe vectors of the osp(1|2) Gaudin model,” Lett. Math. Phys. 55 no. 1, (2001) 77–95, http://dx.doi.org/10.1023/A:1010950003268 MR1845802
[207] P. P. Kulish and N. Manojlović, “Creation operators and Bethe vectors of the \(osp(1|2)\) Gaudin model,” *J. Math. Phys.* **42** no. 10, (2001) 4757–4778. http://dx.doi.org/10.1063/1.1398584 MR1855095

[208] V. D. Lyakhovsky, A. Stolin, and P. P. Kulish, “Chains of Frobenius subalgebras of \(so(M)\) and the corresponding twists,” *J. Math. Phys.* **42** no. 10, (2001) 5006–5019. http://dx.doi.org/10.1063/1.1402177 MR1855355

[209] P. P. Kulish and A. I. Mudrov, “Quantization of inhomogeneous Lie bialgebras,” *J. Geom. Phys.* **42** no. 1-2, (2002) 64–77. http://dx.doi.org/10.1016/S0393-0440(01)00073-0 MR1894076

[210] D. N. Ananikyan, P. P. Kulish, and V. D. Lyakhovsky, “Full chains of twists for symplectic algebras,” *Algebra i Analiz* **14** no. 3, (2002) 27–54. MR1921987

[211] E. V. Damaskinsky, P. P. Kulish, and M. A. Sokolov, “Unified quantization of three-dimensional bialgebras,” *Zap. Nauchn. Sem. S.-Peterburg. Otdel. Mat. Inst. Steklov. (POMI)* **291** no. Vopr. Kvant. Teor. Polya i Stat. Fiz. 17, (2002) 169–184, 281. http://dx.doi.org/10.1023/B:JOTH.0000049571.26334.b7 MR1948815

[212] P. P. Kulish and A. M. Zeitlin, “Group-theoretic structure and the inverse scattering problem method for the super KdV equation,” *Zap. Nauchn. Sem. S.-Peterburg. Otdel. Mat. Inst. Steklov. (POMI)* **291** no. Vopr. Kvant. Teor. Polya i Stat. Fiz. 17, (2002) 185–205, 281. http://dx.doi.org/10.1023/B:JOTH.0000049572.41993.9f MR1948816

[213] A. A. Stolin, P. P. Kulish, and E. V. Damaskinsky, “On the construction of the universal twist element,” *Zap. Nauchn. Sem. S.-Peterburg. Otdel. Mat. Inst. Steklov. (POMI)* **291** no. Vopr. Kvant. Teor. Polya i Stat. Fiz. 17, (2002) 228–244, 282. http://dx.doi.org/10.1023/B:JOTH.0000049574.67818.ed MR1948818

[214] M. Chaichian and P. P. Kulish, “Spin Hamiltonians, quantum groups and reaction-diffusion processes,” in *Multiple facets of quantization and supersymmetry*, pp. 310–319. World Sci. Publ., River Edge, NJ, 2002. http://dx.doi.org/10.1142/9789812777065_0024 MR1964909

[215] P. P. Kulish and A. Stolin, “Twists in Hopf algebras and \(RT_1T_2 = T_2T_1\) relations,” *Czechoslovak J. Phys.* **52** no. 11, (2002) 1255–1260. http://dx.doi.org/10.1023/A:1021341121820 Quantum groups and integrable systems (Prague, 2002). MR1966936

[216] A. Stolin, P. P. Kulish, and E. V. Damaskinsky, “On reconstruction of universal twist from \(R\)-matrix.” Preprint of St. Petersburg Steklov Math. Inst. (2002); Zap. Nauch. Semin. PDMI 291 (2002) 228 - 244; math.QA/0307306

[217] P. P. Kulish and N. Manojlović, “Trigonometric \(osp(1|2)\) Gaudin model,” *J. Math. Phys.* **44** no. 2, (2003) 676–700. http://dx.doi.org/10.1063/1.1531250 MR1952209
[218] J. Donin, P. P. Kulish, and A. I. Mudrov, “On a universal solution to the reflection equation,” *Lett. Math. Phys.* 63 no. 3, (2003) 179–194. [http://dx.doi.org/10.1023/A:1024438101617](http://dx.doi.org/10.1023/A:1024438101617) MR1992884

[219] P. P. Kulish, “On spin systems related to the Temperley-Lieb algebra,” *J. Phys. A* 36 no. 38, (2003) L489–L493 [http://dx.doi.org/10.1088/0305-4470/36/38/101](http://dx.doi.org/10.1088/0305-4470/36/38/101) MR2006441

[220] P. P. Kulish, “Quantum groups and integrable models,” in *Factorization and integrable systems (Faro, 2000)*, vol. 141 of *Oper. Theory Adv. Appl.*, pp. 131–154. Birkhäuser, Basel, 2003. MR2021097

[221] P. P. Kulish, “Introduction to classical and quantum integrable systems.”

[222] E. Celeghini and P. P. Kulish, “Deformation of orthosymplectic Lie superalgebra osp(1|4),” *J. Phys. A* 37 no. 20, (2004) L211–L216 [http://dx.doi.org/10.1088/0305-4470/37/20/L01](http://dx.doi.org/10.1088/0305-4470/37/20/L01) MR2065667

[223] P. P. Kulish and A. M. Zeitlin, “Superconformal field theory and SUSY $N = 1$ KdV hierarchy. I. Vertex operators and Yang-Baxter equation,” *Phys. Lett. B* 597 no. 2, (2004) 229–236 [http://dx.doi.org/10.1016/j.physletb.2004.07.019](http://dx.doi.org/10.1016/j.physletb.2004.07.019) MR2093604

[224] P. P. Kulish and A. M. Zeitlin, “Integrable structure of superconformal field theory and quantum super-KdV theory,” *Phys. Lett. B* 581 no. 1-2, (2004) 125–132 [http://dx.doi.org/10.1016/j.physletb.2003.12.008](http://dx.doi.org/10.1016/j.physletb.2003.12.008) MR2102324

[225] M. Chaichian, P. P. Kulish, K. Nishijima, and A. Tureanu, “On a Lorentz-invariant interpretation of noncommutative space-time and its implications on noncommutative QFT,” *Phys. Lett. B* 604 no. 1-2, (2004) 98–102 [http://dx.doi.org/10.1016/j.physletb.2004.10.045](http://dx.doi.org/10.1016/j.physletb.2004.10.045) MR213761

[226] P. P. Kulish and A. M. Zeitlin, “Quantization of integrable models with hidden symmetries: super-KdV equation,” *Journal of Modern Optics* 51 no. 6-7, (APR 15, 2004) 1107–1108. 5th Workshop on Mysteries, Puzzles and Paradoxes in Quantum Mechanics (MPPinQM-5), Palazzo Feltrinelli, Gargnano, ITALY, SEP 01-05, 2003. ISI:000221185600049

[227] P. P. Kulish and A. M. Zeitlin, “Superconformal field theory and SUSY $N = 1$ KdV hierarchy. II. The $Q$-operator,” *Nuclear Phys. B* 709 no. 3, (2005) 578–591 [http://dx.doi.org/10.1016/j.nuclphysb.2004.12.031](http://dx.doi.org/10.1016/j.nuclphysb.2004.12.031) MR2123217

[228] P. P. Kulish and A. M. Zeitlin, “The quantum inverse problem method and (super)conformal field theory,” *Teoret. Mat. Fiz.* 142 no. 2, (2005) 252–264 [http://dx.doi.org/10.1007/s11232-005-0054-5](http://dx.doi.org/10.1007/s11232-005-0054-5) MR2141776

[229] P. P. Kulish and A. M. Zeitlin, “Quantum supersymmetric Toda-mKdV hierarchies,” *Nuclear Phys. B* 720 no. 3, (2005) 289–306 [http://dx.doi.org/10.1016/j.nuclphysb.2005.06.002](http://dx.doi.org/10.1016/j.nuclphysb.2005.06.002) MR2153657
[230] P. P. Kulish and P. D. Ryasichenko, “A spin chain connected with the quantum superalgebra \(sl_q(1|1)\),” *Zap. Nauchn. Sem. S.-Peterburg. Otdel. Mat. Inst. Steklov. (POMI)* 325 no. Teor. Predst. Din. Sist. Komb. i Algoritm. Metody. 12, (2005) 146–162, 246–247, http://dx.doi.org/10.1007/s10958-006-0339-8, MR2160324

[231] P. P. Kulish, “Noncommutative geometry and quantum field theory,” in *Noncommutative geometry and representation theory in mathematical physics*, vol. 391 of *Contemp. Math.*, pp. 213–221. Amer. Math. Soc., Providence, RI, 2005, http://dx.doi.org/10.1090/conm/391/07331, MR2184025

[232] P. P. Kulish and A. I. Mudrov, “Baxterization of solutions to reflection equation with Hecke \(R\)-matrix,” *Lett. Math. Phys.* 75 no. 2, (2006) 151–170, http://dx.doi.org/10.1007/s11005-005-0043-5, MR2213317

[233] P. P. Kulish, V. D. Lyakhovsky, and M. E. Samsonov, “Twists in \(U(sl_3)\) and their quantizations,” *J. Phys. A* 39 no. 24, (2006) 7669–7692, http://dx.doi.org/10.1088/0305-4470/39/24/005, MR2236645

[234] P. P. Kulish, “Twist of quantum groups and noncommutative field theory,” *Zap. Nauchn. Sem. S.-Peterburg. Otdel. Mat. Inst. Steklov. (POMI)* 335 no. Vopr. Kvant. Teor. Polya i Stat. Fiz. 19, (2006) 188–204, http://dx.doi.org/10.1007/s10958-007-0166-6, MR2269757

[235] L. Frappat, P. Kulish, E. Ragoucy, V. Rivesseau, and P. Sorba, “Editorial: in memoriam Daniel Arnaudon,” *Ann. Henri Poincaré* 7 no. 7-8, (2006) 1213–1216, http://dx.doi.org/10.1007/s00023-006-0279-3, MR2283730

[236] P. P. Kulish and A. I. Mudrov, “Dynamical reflection equation,” in *Quantum groups*, vol. 433 of *Contemp. Math.*, pp. 281–309. Amer. Math. Soc., Providence, RI, 2007, http://dx.doi.org/10.1090/conm/433/08331, MR2349627

[237] A. Fring, P. Kulish, N. Manojlovic, Z. Nagy, J. Nunes da Costa, and H. Samtleben, “Special issue on recent developments in infinite dimensional algebras and their applications to quantum integrable systems,” *J. Phys. A* 40 no. 33, (2007) i–ii.

[238] P. P. Kulish and N. Manožlovich, “Quantum algebras with representation ring of type \(sl(2)\),” *Zap. Nauchn. Sem. S.-Peterburg. Otdel. Mat. Inst. Steklov. (POMI)* 347 no. Vopr. Kvant. Teor. Polya i Stat. Fiz. 20, (2007) 167–177, 242, http://dx.doi.org/10.1007/s10958-008-9011-9, MR2458890

[239] P. P. Kulish and P. D. Ryasichenko, “The algebraic Bethe ansatz for a seven-vertex model,” *Zap. Nauchn. Sem. S.-Peterburg. Otdel. Mat. Inst. Steklov. (POMI)* 347 no. Vopr. Kvant. Teor. Polya i Stat. Fiz. 20, (2007) 178–186, 242, http://dx.doi.org/10.1007/s10958-008-9012-8, MR2458891

[240] P. P. Kulish, N. Manojlovic, and Z. Nagy, “Quantum symmetry algebras of spin systems related to Temperley-Lieb \(R\)-matrices,” *J. Math. Phys.* 49 no. 2, (2008) 023510, 9, http://dx.doi.org/10.1063/1.2873025, MR2392870
[241] M. Chaichian, P. P. Kulish, A. Tureanu, R. B. Zhang, and X. Zhang, “Noncommutative fields and actions of twisted Poincaré algebra,” *J. Math. Phys.* **49** no. 4, (2008) 042302, 16 [http://dx.doi.org/10.1063/1.2907580](http://dx.doi.org/10.1063/1.2907580). MR2412281

[242] P. P. Kulish, “Models solvable by Bethe ansatz,” *J. Gen. Lie Theory Appl.* **2** no. 3, (2008) 190–200 [http://dx.doi.org/10.4303/jglta/S080317](http://dx.doi.org/10.4303/jglta/S080317). MR2435011

[243] B. Aneva, M. Chaichian, and P. P. Kulish, “From quantum affine symmetry to the boundary Askey-Wilson algebra and the reflection equation,” *J. Phys. A* **41** no. 13, (2008) 135201, 18 [http://dx.doi.org/10.1088/1751-8113/41/13/135201](http://dx.doi.org/10.1088/1751-8113/41/13/135201). MR2451509

[244] A. Fring, P. P. Kulish, N. Manojlović, Z. Nagy, J. Nunes da Costa, and H. Samtleben, “Infinite dimensional algebras and their applications to quantum integrable systems,” *J. Phys. A* **41** no. 19, (2008) 190301, 2 [http://dx.doi.org/10.1088/1751-8121/41/19/190301](http://dx.doi.org/10.1088/1751-8121/41/19/190301). MR2452174

[245] P. Kulish and V. Lyakhovsky, “String functions for affine Lie algebras integrable modules,” *SIGMA Symmetry Integrability Geom. Methods Appl.* **4** (2008) Paper 085, 18 [http://dx.doi.org/10.3842/SIGMA.2008.085](http://dx.doi.org/10.3842/SIGMA.2008.085). MR2470511

[246] E. S. Gutshaft and P. P. Kulish, “Discrete symmetries, the Darboux transformation, and exact solutions in the Wess-Zumino-Novikov-Witten model,” *Zap. Nauchn. Sem. S.-Peterburg. Otdel. Mat. Inst. Steklov. (POMI)* **360** no. Teoriya Predstavleniĭ, Dinamicheskie Sitemy, Kombinatormyne Metody. XVI, (2008) 139–152, 297 [http://dx.doi.org/10.1007/s10958-009-9420-4](http://dx.doi.org/10.1007/s10958-009-9420-4). MR2759743

[247] M. Iil’in, P. Kulish, and V. Lyakhovsky, “On the properties of branching coefficients for affine Lie algebras,” *Algebra i Analiz* **21** no. 2, (2009) 52–70 [http://dx.doi.org/10.1090/S1061-0022-10-01090-3](http://dx.doi.org/10.1090/S1061-0022-10-01090-3). MR2549451

[248] P. Aschieri, M. Dimitrijević, P. Kulish, F. Lizzi, and J. Wess, *Noncommutative spacetimes*, vol. 774 of *Lecture Notes in Physics*. Springer-Verlag, Berlin, 2009. [http://dx.doi.org/10.1007/978-3-540-89793-4](http://dx.doi.org/10.1007/978-3-540-89793-4). Symmetries in noncommutative geometry and field theory. MR2722298

[249] P. P. Kulish, N. Manojlović, and Z. Nagy, “Symmetries of spin systems and Birman-Wenzl-Murakami algebra,” *J. Math. Phys.* **51** no. 4, (2010) 043516, 15 [http://dx.doi.org/10.1063/1.3366259](http://dx.doi.org/10.1063/1.3366259). MR2662503

[250] P. N. Bibikov and P. P. Kulish, “The three-magnon problem and the integrability of rung-dimerized spin ladders,” *Zap. Nauchn. Sem. S.-Peterburg. Otdel. Mat. Inst. Steklov. (POMI)* **374** no. Voprosy Kvantovo˘ ı Teorii Polya i Statistichesko˘ ı Fiziki. 21, (2010) 44–57, 268–269 [http://dx.doi.org/10.1007/s10958-010-0026-7](http://dx.doi.org/10.1007/s10958-010-0026-7). MR2749810

[251] M. Ilyin, P. Kulish, and V. Lyakhovsky, “Folded fans and string functions,” *Zap. Nauchn. Sem. S.-Peterburg. Otdel. Mat. Inst. Steklov. (POMI)* **374** no. Voprosy
[252] P. Kulish, N. Manojlović, M. Samsonov, and A. Stolin, “Bethe ansatz for the deformed Gaudin model,” Proc. Est. Acad. Sci. 59 no. 4, (2010) 326–331. [253] P. P. Kulish, N. Manojlović, and Z. Nagy, “Jordanian deformation of the open xxx spin chain,” Theoretical and Mathematical Physics 163 no. 2, (May, 2010) 644–652.

[254] P. Kulish and A. Mudrov, “Twisting adjoint module algebras,” Lett. Math. Phys. 95 no. 3, (2011) 233–247. [255] J. Avan, P. P. Kulish, and G. Rollet, “Reflection K-matrices related to Temperley-Lieb R-matrices,” Theoret. and Math. Phys. 169 no. 2, (2011) 1530–1538.

[256] N. M. Bogolyubov and P. P. Kulish, “Exactly solvable models of nonlinear quantum optics,” Zap. Nauchn. Sem. S.-Peterburg. Otdel. Mat. Inst. Steklov. (POMI) 398 no. Voprosy Kvantovoi Teorii Polya i Statisticheskoi Fiziki. 22, (2012) 26–54, 223.

[257] P. P. Kulish, V. D. Lyakhovsky, and O. V. Postnova, “Multiplicity function for tensor powers of modules of the An algebra,” Theoret. and Math. Phys. 171 no. 2, (2012) 666–674. [258] P. P. Kulish, V. D. Lyakhovsky, and O. V. Postnova, “Tensor power decomposition. Bn case,” J. Physics: Conf. Ser. 343 no. 1, (2012) 012095.

[259] P. P. Kulish, “Integrable spin chains and representation theory,” in Symmetries and groups in contemporary physics, vol. 11 of Nankai Ser. Pure Appl. Math. Theoret. Phys., pp. 487–492. World Sci. Publ., Hackensack, NJ, 2013.

[260] J. Avan, P. P. Kulish, and G. Rollet, “Reflection matrices from Hadamard-type Temperley-Lieb R-matrices,” Theoret. and Math. Phys. 179 no. 1, (2014) 387–394.

[261] P. P. Kulish, V. D. Lyakhovsky, and O. V. Postnova, “Multiplicity functions for tensor powers. Ann-case,” in 7TH International Conference on Quantum Theory and Symmetries (QTS7), vol. 343 of Journal of Physics Conference Series, Czech Tech Univ, Fac Nucl Sci & Phys Engn, Dept Math & Phys; Bogoliubov Lab Theoret Phys Joint Inst Nucl Res; Acad Sci, Inst Phys. 2012. 7th International Conference on
[262] P. P. Kulish, V. D. Lyakhovsky, and O. V. Postnova, “Tensor powers for non-simply laced Lie algebras B-2-case,” in Algebra, Geometry, and Mathematical Physics 2010, Abramov, V and Fuchs, J and Paal, E and Shestopalov, Y and Silvestrov, S and Stolin, A, ed., vol. 346 of Journal of Physics Conference Series. 2012. 6th Baltic-Nordic Workshop on Algebra, Geometry, Mathematical Physics (AGMP), Sven Loven Ctr Marine Sci, Sweden, Oct 25-31, 2010. ISI:000305176100012

[263] I. Y. Aref’eva, V. M. Buchstaber, E. P. Velikhov, A. B. Zhizhchenko, V. E. Zakharov, I. A. Ibragimov, S. V. Kislyakov, V. V. Kozlov, P. P. Kulish, L. N. Lipatov, V. P. Maslov, V. A. Matveev, S. P. Novikov, Y. S. Osipov, A. M. Polyakov, V. A. Rubakov, M. A. Semenov-Tian-Shansky, Y. A. Simonov, Y. G. Sinai, A. A. Slavnov, I. A. Sokolov, L. A. Takhtajan, V. E. Fortov, and S. L. Shatashvili, “Ludvig Dmitrievich Faddeev (on his 80th birthday),” Russian Mathematical Surveys 69 no. 6, (2014) 1133–1142. ISI:000350984400006

[264] J. Avan, T. Fonseca, L. Frappat, P. P. Kulish, E. Ragoucy, and G. Rollet, “Temperley-Lieb R-matrices from generalized Hadamard matrices,” Theoret. and Math. Phys. 178 no. 2, (2014) 223–238. http://dx.doi.org/10.1007/s11232-014-0138-1 Russian version appears in Teoret. Mat. Fiz. 178 (2014), no. 2, 255–273. MR3301515

[265] E. V. Damaskinsky, P. P. Kulish, and M. A. Sokolov, “On calculation of generating functions of Chebyshev polynomials in several variables,” J. Math. Phys. 56 no. 6, (2015) 063507, 11 http://dx.doi.org/10.1063/1.4922997 MR3369004

[266] P. A. Valinevich, S. E. Derkachev, P. P. Kulish, and E. M. Uvarov, “Construction of eigenfunctions for a system of quantum minors of the monodromy matrix for an SL(n, C)-invariant spin chain,” Teoret. Mat. Fiz. 189 no. 2, (2016) 149–175. http://dx.doi.org/10.4213/tmf9106 MR3589027