

CURRICULUM VITAE: MARIANNA EULER

Date: December 2024.

CURRENT AFFILIATION

Vice-President of the ISNMP (since November 2023 - ongoing)

International Society of Nonlinear Mathematical Physics (ISNMP)

Auf der Hardt 27, 56130 Bad Ems

Germany

Website: *isnmp.de/*

and

Visiting Researcher (since May 2019 - ongoing)

Centro Internacional de Ciencias

Av Universidad s/n Colonia

Chamipla, 62210 Cuernavaca, Morelos

Mexico

Former Appointment: 01.04.1999 to 16.04.2019:

Associate Professor

Department of Mathematics

Luleå University of Technology, Luleå

Sweden.

ACADEMIC QUALIFICATIONS

- **Diplom in Mathematics:** (*equivalent to MSc*)

Kiev State University in the Faculty of Mathematics, 1983

Specialization: Differential Equations

Main subjects: Differential Equations, Stability Theory, Asymptotic Methods in Nonlinear Mechanics, Mathematical Physics, Periodical and Quasi-Periodical Solutions of Differential Equations.

Other subjects: Algebra, Analytic Geometry, Functions of Complex Variables, Differential Geometry, Didactic in Mathematics, Functional Analysis and Integral Equation, Mathematical Analysis, Mathematical Logic, Optimization, Operational Research, Topology, Probability Theory and Mathematical

Statistics, Pedagogics, Theoretical Mechanics.

MSc Thesis: Exact solutions of some multidimensional wave equation.

Awarded Qualification: Mathematician and Teacher of Mathematics.

- **Ph.D in Mathematical Physics and Differential Equations**

Kiev Institute of Mathematics of the Ukrainian Academy of Sciences,

July 6, 1988.

Subject of Specialization: Differential Equations and Mathematical Physics

Thesis: Applications of asymptotic methods for solving some nonlinear wave equations.

Supervisor: Professor Yu. A. Mitropolskii.

- **Second Ph.D in Mathematics**

Luleå University of Technology, Department of Mathematics, Luleå, Sweden,

June 5, 1998

Thesis: Group theoretical methods for solving multidimensional nonlinear partial differential equations

Supervisor: Professor L.-E. Persson

- **Docent/Associate Professor in Mathematics**

Luleå University of Technology, Luleå, Sweden, August 30, 2002.

RESEARCH GRANTS AND FUNDS:

- VR Travel Grant (18 000 SEK): Invited speaker at the “*The Third World Congress of Nonlinear Analysis*”, Catania (Italy), 19–26 July, 2000.
- Wallenberg Research Grant (200 000 SEK) Dnr KAW 2000.0048 for the period 2001-2002.
- VR Travel Grant (13 500 SEK): Invited speaker at the International Conference “*Nonlinear Physics: Theory and Experiment 3*”, Gallipolli (Leece), Italy, June 24 – July 3, 2004.
- Special Grant from the President of LTU and the Royal Academy of Sciences (corresponding to 20 percent reduction of my teaching load): Invited participant

for a Special Programme “Wave Motion”, in *Mittag-Leffler Institute*, Stockholm, November 2005.

- Faculty Research Grant (1 500 000 SEK) Dnr 2557-05 for the period 2006-2008.
- VR (Swedish Research Links) Research Grant (450 000 SEK for Swedish participants) for the period 2007 – 2010. Bilateral project “*Classification of integrable differential equations and applications*” in collaboration with South Africa. Swedish participants: Prof. N. Euler, Dr. M. Euler.
South African participants: Prof. P.G.L. Leach, Dr. S. Moyo, A. Maharaj, K. Andriopoulos.
- VR Travel Grant (24 300 SEK): Invited speaker at the International Conference “*Nonlinear Physics: Theory and Experiment V*”, Gallipoli (Leece), Italy, 12–21 June, 2008.
- VR Travel Grant (16 200 SEK): Invited speaker at the “*Fifth World Congress of Nonlinear Analysis*” WCNA-2008, Orlando, Florida, USA, 2-9 July, 2008.
- Visiting researcher at the *Schrödinger Institute of Mathematical Physics*, University of Vienna, Austria, in May 2011 (three weeks). Partially funded by the Schrödinger Institute.
- Sabbatical research visit to the *New Jersey Institute of Technology*, USA, for three month during May to end of July 2012. Financed by Wenner-Grenn Foundation, Sweden (40 000 SEK).
- Magnuson Foundation for a research visit to the University of Santiago, Chile, during 20 - 30 March, 2018. (SEK 12500).

ACADEMIC APPOINTMENTS:

- 01.05.2019 – ongoing: Visiting Research Professor
Centro Internacional de Ciencias
Av Universidad s/n Colonia
Chamipla, 62210 Cuernavaca, Morelos
Mexico

- 30.08.2002 – 15.04.2019: Associate Professor
Department of Mathematics at the Luleå University of Technology, Luleå, Sweden.
- 01.04.1999 – 29.08.2002: Senior Lecturer/Assistant Professor
Department of Mathematics at the Luleå University of Technology, Luleå, Sweden.
- 01.07.1998 – 31.03.1999: Temporary Senior Lecturer in the Department of Mathematics at the Luleå University of Technology, Luleå, Sweden.
- 01.07.1997 – 30.06.1998: Researcher in the Department of Mathematics at the Luleå University of Technology, Luleå, Sweden.
- 04.03.1996 – 30.06.1997: Maternity leave.
- 01.12.1987 – 03.03.1996: Research Fellow in the Institute of Mathematics of the Ukrainian Academy of Sciences, Kiev, Ukraine.
- 15.11.1983 – 14.11.1987: Ph.D. student in the Institute of Mathematics of the Ukrainian Academy of Sciences, Kiev, Ukraine.
- October – November 1982: Teacher at the Department of Differential Equations, Faculty of Mathematics, Kiev State University, Ukraine.

SUMMARY OF TEACHING EXPERIENCE

I have been teaching in the Department of Mathematics at Luleå University of Technology since 1997. Below I list the courses that I have taught.

Teaching, administration and external examination:

In the Department of Mathematics, Luleå University of Technology I have been teaching the following courses:

- **Mathematics 1** (*Differential Calculus*): MAM 145 / M0029M (100+ students)
- **Mathematics 2** (*Linear Algebra and Integral Calculus*) MAM 222 / M0030M (100+ students)

- **Mathematics 3** (*Linear Algebra and Differential Equations*) MAM 223 / M0031M (100+ students)
- **Mathematics 4** (*Multivariable functions and modelling*) M0032M (100+ students)
- **Mathematics B** (*Differential equations*) MAM602 (30+ students)
- **Linear Analysis and Fourier Transforms:** M0018M (100+ students)
- **Applied Mathematics** M7018M: Examiner

Supervision of Master in Applied Mathematics:

- (Co-supervisor with N. Euler) A. Strömberg and E. Åström (Masters): Transformation between a generalized Emden-Fowler equation and the first Painlevé transcendent (2003).
- (Co-supervision with N. Euler) N. Petresson (Master): Classes of linearisable hierarchies of evolution equations in 1+1 dimensions (2002)
- (Co-supervision with N. Euler) J. Häggblad (Masters): Symmetries and recursion operators of nonlinear differential equations (2006)

Ph.D supervision:

1. *PhD Supervision of Staffan Lundberg from March 2005 to March 2009:* M.Euler (first supervisor) and Prof. N.Euler (second supervisor). Staffan presented his licensiate thesis titled “*On Adjoint Symmetries and Reciprocal Bäcklund Transformations of Evolution Equations*” on March 20, 2009.
2. *PhD Supervision (second supervisor) of Adhir Maharaj from April 2007 to September 2009:* at the University of Kwazulu-Natal, Durban, South Africa. Prof. Peter Leach was the first supervisor. Adhir Maharaj was awarded a PhD on April 20, 2010 at the University of Kwazulu-Natal, Durban, South Africa. Adhir’s Ph.D thesis is titled “*Singularity and Symmetry Analysis of Differential Sequences*”. The thesis as well as the documents regarding the supervisors can be found on the following link:
<http://researchspace.ukzn.ac.za/10413/8085?show=full>

RESEARCH INTERESTS:

Nonlinear Partial Differential Equation in Mathematical Physics:

Integrability; Linearisation; Transformations (Reciprocal Bäcklund (Auto-Bäcklund) Transformations); Lie Symmetries; Potential Symmetries of Higher order for evolution PDE's; Recursion Operators and higher order symmetries; Construction of Conservation Laws for scalar and systems of evolution equations in (1+1)-and (1+2)-dimensions by the use of an Adjoint Symmetries; Solution Methods for nonlinear PDEs; Application of an approximate symmetries of PDE's in Engineering Problems.

Nonlinear Ordinary Differential Equations:

Integrability; Linearisation; Transformations (Sundman Transformation); Solution Methods; Recursion Operator for ODE's; Applications of an Adjoint Symmetries of PDE's to prove an integrability of ODE's.

AMS Mathematics Subject Classification:

37K35, 37K10, 37K55, 37K15, 37J15, 35Q53, 35Q55, 34A05, 34A25, 34A34, 34M55.

PARTICIPATION IN CONFERENCES AND SEMINARS:

- *Invited Talk* at the *2-nd International Wigner Symposium* (Goslar, Germany), July 15-20, 1991.
- *Invited Talk* at Witwatersrand University (Johannesburg, South Africa) as part of the Seminar Series at the Department of Mathematics, May 1992.
- *Invited Talk* at Pretoria University (Pretoria, South Africa) as part of the Seminar Series at the Department of Mathematics, June 1992.
- *Invited Talk* at the International Workshop, *Modern Group Analysis: Advanced Analytical and Computational Methods in Mathematical Physics* (Catania, Italy), October 27-31, 1992.
- Second International Conference: *Symmetry in Nonlinear Mathematical Physics* (Kiev, Ukraine). July 7–13, 1997.
- *Invited Talk* at the University of Cadiz, Cadiz, Spain, April 2000.

- *Invited Talk at The Third World Congress of Nonlinear Analysts*, (Catania, Italy), July 19-26, 2000.
- *The Öresund Symposium on Partial Differential Equations*, Lund University (Lund, Sweden), May 23-25, 2002.
- Invited talk “*Generalised Hodograph Transformation for Nonlinear Partial Differential Equations*” at the International Conference “*Nonlinear Physics: Theory and Experiment III*”, Gallipoli (Leece), Italy, 24 June - 3 July, 2004.
- Invited talk “*Adjoint symmetries and classification of evolution PDE’s*” at the International Conference “*Nonlinear Physics: Theory and Experiment V*”, Gallipoli (Leece), Italy, 12–21 June, 2008.
- Invited talk “*Reciprocal transformation and higher order conservation laws*” at the “*Fifth World Congress of Nonlinear Analysis*” WCNA-2008, Orlando, Florida, USA, 2-9 July 2008.
- Workshop on the bilateral Ph.D programme with UEM (Mozambique and Sweden), organized by SIDA/SAREC for the Ph.D students and their supervisors from different universities in Sweden. Uppsala, 18-19 September, 2008.
- Talk presented at *MOGRAN-14: The 14th Conference on Modern Group Analysis*, May 25 - June 2, 2010, in Luleå.
- Talk presented at the *Conference on Nonlinear Mathematical Physics: Twenty Years of JNMP*, 4 June - 14 June, 2013, in Nordfjordeid, Norway.
- Talk presented at the *University of Santiago, Chile* as part of a research visit in 20 - 30 March, 2018.
- Talk presented in collaboration with N. Euler at the *Open Communications in Nonlinear Mathematical Physics - 23–29 June 2024* in Bad Ems, Germany.

RESEARCH VISITS:

- *Rand Afrikaans University*, Department of Applied Mathematics, Johannesburg, South Africa. May – June, 1992, April – November 1993 (Prof.W.-H. Steeb and Dr. N. Euler).

- *Catania University*, Department of Mathematics, Italy. November 1992 (Prof. M. Torrisi).
- *University of Durban*, Department of Mathematics and Applied Mathematics, Durban, South Africa. March 1999 (Prof. P.G.L. Leach).
- *University of Cadiz*, Department of Mathematics, Cadiz, Spain. April, 2000 (Prof. M.L. Gandarias).
- *Mittag-Leffler Institute* (Stockholm): Invited participant for a Special Programme on “*Wave Motion*”, Organized by: A. Constantin, Lund; C. Dafermos, Brown; H. Holden, Trondheim; K. H. Karlsen, Trondheim; W. Strauss, Brown. September-December 2005.
- *University Kwazulu-Natal*, Department of Mathematics, Durban, South Africa. April – May, 2006 (Prof. P.G.L. Leach).
- *University Kwazulu-Natal*, Department of Mathematics, Durban, South Africa and Technical University of Durban. April – May, 2008 (Prof. P.G.L. Leach and Dr. S. Moyo).
- Visiting researcher at the *Schrödinger Institute of Mathematical Physics*, University of Vienna, Austria, in May 2011 (three weeks). Partially funded by the Schrödinger Institute.
- Sabbatical research visit to the *New Jersey Institute of Technology*, USA, for three month during May to end of July 2012. Financed by Wenner-Grenn Foundation, Sweden (40 000 SEK).
- Magnuson Foundation for a research visit to the *University of Santiago*, Chile, during 20 - 30 March, 2018. (SEK 12500).
- *Jinan University*, Department of Mathematics, Guangzhou P.R. China:
Visiting Professor: 21 - 27 September 2019.
Invited by Professor Zhang Chuanlin (Jinan University)

List of Published Articles and Books:

51 Articles published in peer reviewed journals and **4 books**.

My **Web of Science *h*-index**: 10

Note: Before 1994 I published under the name: *M. W. Shulga*

ARTICLES:

55. Euler M and Euler N, On 2nd-order fully-nonlinear equations with links to 3rd-order fully-nonlinear equations, **Open Commun. Nonlinear Math. Phys., Special Issue 2**, pp 158–170, 2024, *ocnmp:13765*

<https://doi.org/10.46298/ocnmp.13765>

54. Euler M and Euler N, Potentialisations of a class of fully-nonlinear symmetry-integrable evolution equations **Open Commun. Nonlinear Math. Phys.**, **4**, pp 44–78, 2024, *ocnmp:13214*

<https://doi.org/10.46298/ocnmp.13214>

53. Euler M and Euler N, On fully-nonlinear symmetry-integrable equations with rational functions in their highest derivative: Recursion operators, **Open Communications in Nonlinear Mathematical Physics**, **2**, 216228, 2022.

52. Euler M, Euler N and Nucci M C, On differential equations invariant under twovariable Möbius transformations, **Open Communications in Nonlinear Mathematical Physics**, **2**, 173185, 2022.

51. Euler M, Euler N and Nucci M C, Ordinary differential equations invariant under two-variable Möbius transformations, **Applied Mathematics Letters**, **117**, 2021, 107105, <https://doi.org/10.1016/j.aml.2021.107105>

50. Euler M and Euler N, On the hierarchies of the fully nonlinear Möbius-invariant and symmetry-integrable equations of order three, **J. Nonlinear Math. Phys.**, **27** nr. 4, 521–528, 2020.

49. Hernandez Heredero R, Euler M, Euler N and Reyes E G, Compacton equations and integrability: The Rosenau-Hyman and Cooper-Shepard-Sodano equations **Discrete & Continuous Dynamical Systems - A**, 2020, 40(1): 529-548 doi: 10.3934/dcds.2020021
48. Euler M and Euler N, On Möbius-invariant and symmetry-integrable evolution equations and the Schwarzian derivative, *Studies in Applied Mathematics*, 2019; 1 – 18, <https://doi.org/10.1111/sapm.12268>
47. M Euler and N Euler, “Nonlocal invariance of the multipotentialisations of the Kupershmidt equation and its higher-order hierarchies” In: *Nonlinear Systems and Their Remarkable Mathematical Structures*, Norbert Euler (ed), CRC Press, Boca Raton, USA, 317-351, 2018.
46. M Euler, N Euler and E G Reyes, “Multipotentialisation and nonlocal symmetries: Kupershmidt, Kaup-Kupershmidt and Sawada-Kotera equations”, *J. Nonlinear Math. Phys.*, **24** nr. 3, 303-314, 2017.
- 45.. M Euler, N Euler and M.C. Nucci, “On nonlocal symmetries generated by recursion operators: second-order evolution equations”, *Discrete and Continuous Dynamical Systems: Series A*, **37** nr. 8, 4239-4247, 2017.
44. M Euler and N Euler, “Invariance of the Kaup-Kupershmidt equation and triangular auto-Bäcklund transformations”, *J. Nonlinear Math. Phys.*, **19**, 1220001-1-7, 2012.
43. N Euler and N Euler, “An alternate view on symmetries of second-order linearisable ordinary differential equations”, *Lobachevskii Journal of Mathematics*, **33**, 191-194, 2012.
42. M Euler, N Euler and T Wolf, “The two-component Camassa-Holm equations CH(2,1) and CH(2,2): First-order integrating factors and conservation laws”, *J. Nonlinear Math. Phys.*, **19 Suppl. 1**, 1240002 (10 pages), 2012.

- 41.** M Euler and N Euler, “Integrating factors and conservation laws for some Camassa-Holm type equations”, *Commun. Pure Appl. Anal.*, **11**, 1421-1430, 2012.
- 40.** M. Euler and N. Euler “A class of semilinear fifth-order evolution equations: Recursion operators and multipotentialisations”, *J. Nonlinear Math. Phys.* **18** Suppl. 1, 61-75, 2011.
- 39.** N. Euler and M. Euler, “The converse problem for the multipotentialisation of evolution equations and systems”, *J. Nonlinear Math. Phys.* **18** Suppl. 1, 77-105, 2011.
- 38.** M. Euler, N. Euler and PGL Leach “Properties of the Calogero-Degasperis-Ibragimov-Shabat differential sequence”, *Lobachvskii Journal of Mathematics*, **32**, no.1, pp.61-69, 2011
- 37.** N. Euler and M. Euler “Multipotentialisation and iterating-solution formulae: The Krichever-Novikov equation”, *Journal of Nonlinear Mathematical Physics*, **16**, Supplement pp.93-106, 2009.
- 36.** N. Euler and M. Euler “ On nonlocal symmetries, nonlocal conservation laws and nonlocal transformations of evolution equations:Two linearisable hierarchies “, *Journal of Nonlinear Mathematical Physics*, **16**, pp. 489-504, 2009.
- 35.** M. Euler, N. Euler and S. Lundberg “ On reciprocal Bäcklund transformations of autonomous evolution equations”, *Theoretical and Mathematical Physics.*, **159**, pp. 770-778, 2009.
- 34.** F. Calogero, M. Euler and N. Euler. “ New evolution PDEs with many isochronous solutions”, *Journal of mathematical Analysis and Applications.*, **353**, pp. 481-488, 2009.
- 33.** Euler M. “ Fourth-order recursion operators for third-order evolution equations”, *Journal of Nonlinear Mathematical Physics.*, **15**, issue 2, pp. 147 - 151., 2008.
- 32.** Euler M. and Euler N. *Second-order recursion operators of third-order evolution*

equations with fourth-order integrating factors, J. Nonlinear Math. Phys., **14**, 313–315, 2007.

31. Euler M, Euler N, A Strömberg and Aström. *Transformation between a Generalised Emden-Fowler Equation and the First Painlevé Transcendent*, Math. Meth. Appl. Sci. **30**, 2121–2124, 2007.

30. Euler M, Euler N and Leach PGL. *The Riccati and Ermakov-Pinney Hierarchies*, J. Nonlinear Math. Phys., **14**, 290–302, 2007.

29. Euler N. and Euler M. *Sundman Symmetries of Nonlinear Second-Order and Third-Order Ordinary Differential Equations*, J. Nonlinear Math. Phys. **11**(3), 399–421, 2004.

28. Petersson N., Euler N. and Euler M. *Recursion operators for a class of integrable third-order evolution equations*, Studies in Applied Mathematics **112**, 201–225, 2004.

27. Euler M., Euler N. and Petersson N. *Linearisable hierarchies of evolution equations in (1+1)dimension*, Studies in Applied Mathematics **111**(3), 315–337, 2003.

26. Euler N., Wolf T., PGL Leach and Euler M. *Linearisable third order ordinary differential equations and generalised Sundman transformations. The Case $X''=0$* , Acta Applicandae Mathematica **76**, 89–115, 2003.

25. Euler N. and Euler M. *A tree of linearizable second-order evolution equations by generalized hodograph transformations*, Journal of Nonlinear Mathematical Physics, **8**(3), 342–362, 2001.

24. Euler M. and Euler N. *n-dimensional real wave equations and the d'Alembert-Hamilton system*, Nonlinear Analysis: Theory, Methods and Applications, **47**(8), 5125–5133, 2001.

23. Euler N., Gandarias M.L., Euler M. and Lindblom O. *Auto-hodograph transformations for a hierarchy of nonlinear evolution equations*, Journal of Mathematical Analysis and Applications, **257**, 21–28, 2001.

- 22.** Euler M., Euler N. and Lindblom O. *Explicitly space- and time-dependent d'Alembert equations with symmetries*, Int. J. Mod. Phys. A, **14**, 4189–4200, 1999.
- 21.** Euler N., Lindblom O., Euler M. and Persson L-E. *The higher dimensional Bateman equation and Painlevé analysis of nonintegrable wave equations*, Proceedings of the Second International Conference: Symmetry in Nonlinear Mathematical Physics, Vol. 1, 185–192, 1997.
- 20.** Euler M. and Euler N. *Symmetry for a class of explicitly space- and time-dependent (1+1)-dimensional wave equations*, Proceedings of the Second International Conference: Symmetry in Nonlinear Mathematical Physics, Vol. 1, 70–78, 1997.
- 19.** Euler N. and Euler M. *Madelung representation for complex nonlinear d'Alembert equations in n-dimensional Minkowski space.*, J. Nonlinear Math. Phys., **2**, 292–300, 1995.
- 18.** Basarab-Horwath P, Euler N, Euler M and Fushchych W. I. *Amplitude-phase representation for solutions of nonlinear D'Alembert equations*, J. Phys. A: Math. Gen., **28**, 6193–6201, 1995.
- 17.** Euler M., Euler N., Zachary W. W., Mahmood M. F. and Gill T. L. *Symmetry classification for a coupled nonlinear Schrödinger equation*, Nonlinear Math. Phys., **1**, 358–379, 1994.
- 16.** Euler N. Euler M. and Köhler A. *Conditional and approximate symmetries for a generalized van der Pol equation*, J. Lie Groups and their Appl., **1**, 79–94, 1994.
- 15.** Euler M, Euler N. and Köhler A. *On the construction of approximate solutions for a multidimensional nonlinear heat equation*, J. Phys. A: Math. Gen., **27**, 2083–2092, 1994.
- 14.** Euler N. and Euler M. *Symmetry properties of the approximations of multidimensional generalized van der Pol equations*, Nonlinear Math. Phys., **1**, 41–59, 1994.

13. Euler N, Shul'ga M.W. and Steeb W.-H. *Lie symmetries and Painlevé test for explicit space -and time - depend nonlinear wave equations*, J.Phys.A: Math.Gen., **26**, L307–313, 1993.
12. Euler N., Shul'ga M. W. and Steeb W.-H. *Approximate symmetries and approximate solutions for a multidimensional Landau-Ginzburg equation*, J. Phys. A: Math. Gen., **25**, L1095–L1103, 1992.
11. Mitropolskii Yu. A. and Shul'ga M. W, *Approximate symmetry of the nonlinear heat equation*, Ukr. Math. J. (in Russian), **43**, no.6, 833-837, 1991.
10. Shul'ga M. W. *Symmetry of subsets of solutions of the nonlinear wave equation for a complex field* (in Russian), In: Symmetry analysis and exact solutions of nonlinear problems of mathematical physics, Kiev Inst. Math., 112–117, 1990.
9. Shul'ga M. W. *Approximate scale symmetry of a nonlinear multidimensional Schrödinger equation* (in Russian), In: Asymptotic methods in problems of mathematical physics, Kiev Inst. Math., 153–156, 1989.
8. Shul'ga M. W. *A class of nonlinear wave equations that have infinite-dimensional symmetry* (in Russian), In: Symmetry analysis and solutions of equations of mathematical physics, Kiev Inst. Math., 94–96, 1988.
7. Mitropolskii Yu. A., Shul'ga M. W. *Asymptotic and exact solutions of a multidimensional nonlinear equation Schrödinger type*, Ukr. Math. J. (in Russian) **39**, 744–751, 1987.
6. Mitropolskii Yu. A. and Shul'ga M. W. *Asymptotic solutions of a multidimensional nonlinear wave equation*, Sov. Math. Dokl. (in Russian) **295**, 30–33, 1987; Translation into English: **36**, 23–26, 1988.
5. Shul'ga M. W. *Symmetry of systems of equations that approximate nonlinear wave equations* (in Russian), In: Symmetry and solutions of nonlinear equations of mathematical physics, Kiev Inst. of Math., 96–99, 1987.

4. Shul'ga M. W. *The symmetry and some particular solutions of d'Alembert equations with a nonlinear condition* (in Russian), In: Group-theoretical investigations of the equations of mathematical physics, Kiev Inst. of Math., pp. 36–38, 1985.
3. Shul'ga M.W. *Two-dimensional nonlinear wave equations invariant with respect to certain Lie Algebras* (in Russian), In: Algebraic-theoretical methods in problems of mathematical physics, Kiev Inst. of Math., 84–86, 1983.
2. Shul'ga M. W. *Exact and approximate solutions of a nonlinear wave equation* (in Russian) In: Methods of nonlinear mechanics and their applications, Kiev Inst. Math., 149–155, 1982.
1. Shul'ga M. W. *Particular solutions of the wave equation with cubic nonlinearity* (in Russian), In: Algebraic-theoretical methods in mathematical physics, Kiev Inst. of Math., 35–41, 1981.