



Curriculum Vitae
CAIRO UNIVERSITY
FACULTY OF SCIENCE
Department of Mathematics
Giza, EGYPT

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Professor of Applied Mathematics

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EDUCATION:

- Ph.D. Applied Mathematics, Faculty of Science, Cairo University, Giza, EGYPT. (1982)
- Doctorat 3eme Cycle, Mécanique des Fluides, IMG, Grenoble, FRANCE. (1979)
- D.E.A. , Mécanique des Fluids IMG, Grenoble, FRANCE. (1976)
- M.Sc. Applied Mathematics, Faculty of Science, Cairo University, Giza, EGYPT. (1975)
- B.Sc. Pure and Applied Mathematics, Faculty of Science, Cairo University, Giza, EGYPT. (1969)

PERSONAL DATA:

- Born in August 23, 1946.
- Egyptian Native.
- Married with Son and Daughter.
- Very good health.

WORKING COUNTRIES:

EGYPT, FRANCE, ITALY, SUDAN AND SAUDI-ARABIA

SKILLS:

Management Skills:

- Supervised staff group of Fluid Mechanics in EGYPT and SAUDI-ARABIA.

Research Activities:

- Electromagnetic induction in thin sheets, and its applications in oceans (M.Sc. Dissertation).
- Shallow water waves in stratified fluids (D.E.A. report).
- Fluids in rotating circular basins (3eme Cycle).
- Stratified fluids and physical oceanography (Ph.D. Dissertation).
- Non-linear P.D. Equations and soliton solutions.
- Computational Fluid Mechanics.
- Tsunamis.
- Wavelets.

Teaching Activities:

Post-graduate Courses:

1. Computational Fluid Dynamics.

- Chow, Chuen-Yen, "An Introduction to Computational Fluid Mechanics", McGraw-Hill Book Co., 1979.
- John D. Anderson, Jr., "Computational Fluid Dynamics", McGraw-Hill Co., 1995.

2. Fluid Mechanics.

- Stoker, J.J., "Water Waves", Interscience Publishers, Inc., New York, 1957.
- Hirsch, C., "Numerical Computation of Internal and External Flows", Vol. I, II, John Wiley, 1988.
- Canuto, C. et al., "Spectral Methods in Fluid Dynamics", Springer-Verlag, 1988.
- Kundu, P.K., "Fluid Mechanics", Academic Press Inc., 1990.

3. Shallow water waves.

- Whitham, G.B., “Linear and nonlinear waves”, John Wiley NY, 1984.

4. Solitons and Compactons.

- Lamb, G.L., “Elements of Soliton Theory”, John Wiley NY, 1980.
- Dodd, R.K. et al, “Solitons and Nonlinear wave equations”, Academic Press, 1982.
- Drazin, P.G. and R.S. Johnson, “Solitons: An Introduction”, Cambridge University Press, Cambridge (UK), 1993.

Undergraduate Courses:

1. Fluid Mechanics I.

- Milne-Thomson, L.M.,” Theoretical Hydrodynamics”, 5th Ed., Macmillan, 1974.
- Shames, I.H., “Mechanics of Fluids”, McGraw-Hill, 3rd Ed., 1991.
- Gerhart, P.M., Gross, R.J. and Hochstein, J.I, “Fundamentals of fluid Mechanics”, Addison Wesley, 1992.
- Roberso and Crowe, “Engineering Fluid Mechanics”, 3rd Ed., Houghton Misslir Publisher, 1992.

2. Fluid Mechanics II

- Milne-Thomson, L.M.,” Theoretical Hydrodynamics”, 5th Ed., Macmillan, 1974.
- White, F.M., “Viscous Fluid Flow”, McGraw-Hill, 1984.
- Munson, B.R., Young, D.F. and Okishi, T.H., “Fundamentals of Fluid Mechanics”, 2nd ed., John Wiley & Sons, 1990.

3. Heat Transfer.

- Chapman, A. J., “Heat Transfer”, Macmilan Pupl. Co., 1989.
- Carslaw, H.S. and Jaeger J.C., “Conduction of Heat in Solids”, Oxford, 1959.]

4. Mechanics I & II

- Loney, S. L., “Statics”, Cambridge Univ. Press, 1960.
- Loney, S. L., “Dynamics of Particle”, Cambridge Univ. Press, 1960.
- Ramsey, A.S., “Dynamics”, Part I & II, Cambridge Univ. Press, 1960.
- Hibbler, R.C., “Engineering Mechanics, Statics and Dynamics”, 6th Ed., Macmillan Publ. Co., 1992.

5. Computational Fluid Dynamics.

- Chow, Chuen-Yen, “An Introduction to Computational Fluid Mechanics.
- D.A. Anderson, J.C. Tannehill and R.H. Pletcher, “Computational Fluid Mechanics and Heat Transfer”, McGraw-Hill Book Co., 1984.

6. Analytical Mechanics

- Goldstein, H., "Classical Mechanics", 2nd Ed., Addison- Wesley Publishing Co., 1980.
- Gantemacher, F., "Lectures in Analytical Mechanics", Mir Publishers, 1970.

7. Numerical Analysis

- Burden, R.L. and Faires, J.D., "Numerical Analysis", 3rd Ed., Prindle, Weber & Schmidt, Boston, 1985.

8. Partial Differential Equations

- Sneddon, I., "Element of Partial Differential Equations", Int. Edition, McGraw-Hill, 1985.
- Kevorkian, J., "Partial Differential Equations, Analytical Solution Techniques", The Wadsworth & Books/Cole Advanced Books & Software, 1990.

9. Theory of Elasticity

- Muskhelishvili, N.I., "Some Basic Problems of Mathematical Theory of Elasticity", Noordhoff Ltd., 1963.

10. Introduction to Computer Science

- Using some Arabic references.

EXPERIENCE:

1969-1975	Instructor of Mathematics (Pure and Applied) at the Dept. of Mathematics, Faculty of Science, Cairo University.
1975-1982	Researcher at the "Institute de Mécanique de Grenoble", FRANCE.
1982-1983	Lecturer of Applied Mathematics At Cairo University, Faculty of Science.
1983	Post-Doctoral Research Fellow, ICTP, Trieste, ITALY.
1983-1984	Lecturer of Applied Maths. At Cairo University (Khartoum Branch), Faculty of Science, SUDAN.
1984 -1985	Lecturer of Applied Maths. At Cairo University, Faculty of Science.
1985-1990	Assistant Professor of Applied Maths. College of education for girls, Riyadh, SAUDI ARABIA.
1990-1991	Associate Professor of Applied Maths. College of education for girls, Riyadh, SAUDI ARABIA.
1991-2000	Associate Professor of Applied Maths. At Cairo University, Faculty of Science.
2001-	Professor of Applied Mathematics At Cairo University, Faculty of Science.

UNIVERSITY SERVICE:

- Member, Department of Mathematics Committee, Cairo University.(1991-).
- Member, Graduate Study Committee, Faculty of Science, Cairo University (1992-2001).
- Member, Faculty of Science Committee, Cairo University(2001).
- One of the supervisors, Computer Laboratory, Faculty of Science, Cairo University.
- Member, Committee of Club of Computer, Faculty of Science, Cairo University
- One of the supervisors of the seminars of Applied Mathematics, Faculty of Science, Cairo University.

SOCIETIES MEMBERSHIP:

- Institute of Physics (IoP), **Fellow (FInstP)**.
- Institute of Mathematics and its Applications (IMA), **Fellow (FIMA)**.
- Royal Astronomical Society (RAS), **Fellow (FRAS)**.
- American Mathematical Society (AMS), **member**.(1986-2000)
- London Mathematical Society (LMS), **member**.
- Society of Industrial and Applied Mathematics (SIAM), **member**.(1988-1998)
- Egyptian Mathematical and Physical Society (EMPS), **Chairman**.
- Egyptian Mathematical Society (EMS), **member of Executive Council**.
- Egyptian Computer Society, **member**.
- Marquis Who's Who in Science and Engineering, 2nd Ed., 1994-1995, 3rd Ed. 1995-1996.
- Marquis Who's Who in the World, from 14th Ed., 1997 till 19th Ed. 2002.

OTHER IMPORTANT SCIENTIFIC ACTIVITIES:

- Associate editor (Journal: Chaos, Solitons and Fractals), section Turbulent Flow and Solitons.
- Member of the editorial boards of IJCMNS, JEMS & AJMMS.
- Vice-Editor in Chief of Journal EMPS.
- Referee for several International and National scientific Journals.
- Member in the National Committee of Theoretical and Applied Mechanics, Egyptian Academy of Scientific research, Cairo-EGYPT.

CURRENT PROJECT:

Solitons (2006-2009)

I am the editor for the Solitons section of the [Encyclopedia of Complexity and System Science](#) , Springer, (2009).

REFERENCES:

1. Prof. A.A. Ashour, (D. Sc.), Mubarak Prize of Basic Sciences(EGYPT)
Department of Mathematics, Faculty of Science, Cairo University,
Giza, EGYPT.
(Supervisor M.Sc. thesis)
2. Prof. J.P. Germain
Institute de Mécanique de Grenoble, Université de Grenoble,
FRANCE. (Supervisor Ph.D. thesis).
3. Prof. M.S. El Naschie (CPhys FInstP)
Professor of theoretical physics (P.O. box 272 Cobham, Surrey KT11
2FQ, UK).
4. Prof. M. Asaad (D.Sc.)
Department of Mathematics, Faculty of Science, Cairo University,
Giza, EGYPT.

HONORS AND AWARDS:

1. First Class Honors in Mathematics 1969.
2. Prize of Musharafa in Mathematics 1969.

SUPERVISED M.Sc. and Ph.D. THESES:

1. Non-Linear Waves in Shallow Water.
(M.Sc. Thesis of Mrs. Hussa Nasser Al- Eissa, 1989).
2. Study of Non-Linear Problems with Some Applications in Shallow Water.
(M.Sc. Thesis of Mr. Omar Hamed El-Kalaawy, 1994).
3. Non-Linear Wave propagation in Fluids.
(M.Sc. Thesis of Mrs. Mona Samir Mehanna, 2001).
4. Wavelet and its applications in Applied Mathematics.
(Ph.D. Thesis of Mrs. Nahla Al-Haggar, 2006).
5. Magnetohydrodynamic stability for axisymmetric incompressible ideal flows.
(Ph.D. Thesis of Mr. Ali El- Seadawy, 2006).
6. Computational Fluid Mechanics and Applications.
(Ph.D. Thesis of Mrs. Mona Samir Mehanna, 2008).

LIST OF PUBLICATIONS:

THESES:

- **M.Sc. Thesis:**
Electromagnetic induction in thin sheets, Dept. of Mathematics, Faculty of Science, Cairo University , Giza, EGYPT, 1975.
- **Doctorat du 3eme Cycle. Thesis:**
Application de la théorie de l'eau profonde au cas des fluides en bicouches et des fluides en milieu tournant. IMG, USMG, Grenoble, FRANCE, 1979.
- **Ph.D. Thesis:**
Application de la théorie de l'eau profonde au cas des fluides en bicouches et des fluides en milieu tournant. Dept. of Mathematics, Faculty of Science, Cairo University, Giza, EGYPT, 1982.

TECHNICAL PAPERS:

1. *M. A. Helal & J. M. Molines, "Non-linear internal waves in shallow water. A theoretical and experimental study", *Tellus*, 33, pp. 488-504 (1981).*
2. *M. A. Helal, "A nonlinear model for the harmonic wave oscillations around a circular island", *Proc. 6th Miami Int. Conf. on Alternative Energy Sources, Vol. 3, pp. 213-218, December 12-13 (1983).**
3. *M. A. Helal & S. Badawi, "Waves in a rotating stratified shallow water", *Il Nuovo Cimento (B)*, 104, 3, pp. 245-262 (1989).*
4. *M. S. Abou-Dina & M. A. Helal, "The influence of a submerged obstacle on an incident wave in stratified shallow water", *Eur. J. Mech. B/Fluids*, 9, 6, pp. 545-564 (1990).*
5. *M. S. Abou-Dina & M. A. Helal, "The effect of a fixed barrier on an incident progressive wave in shallow water", *Il Nuovo Cimento (B)*, 107, 3, pp. 331-344 (1992).*
6. *M. S. Abou-Dina & M. A. Helal, "The effect of a fixed submerged obstacle on an incident wave in stratified shallow water. (Mathematical Aspects)", *Il Nuovo Cimento (B)*, 110, 8, pp. 927-942 (1995).*
7. *M. A. Helal & H. N. El-Eissa, "Shallow water waves and KdV equation (Oceanographical applications)", *PU.M.A.* , 7, 3-4, pp. 263-282 (1996).*
8. *E. H. Doha & M. A. Helal, "An accurate double Chebyshev spectral approximation for parabolic partial differential equations", *J. Egypt. Math. Soc.*, 5, 1, pp. 83-101(1997).*
9. *A.H. Khater, O. H. El-Kalaawy & M. A. Helal, "Two new classes of exact solutions for the KdV equation via Backlund transformations", *Chaos, Solitons and Fractals*; 8, pp 1901-1909 (1997).*

10. A.H. Khater, M. A. Helal & O. H. El-Kalaawy, "Backlund transformations: exact solutions for the KdV and the Calogero - Degasperis-Fokas mKdV equations", *Mathematical methods in Applied Sciences*, 21, pp. 719-731 (1998).
11. M. S. Abou-Dina & M. A. Helal, "Reduction for the nonlinear problem of fluid waves to a system of integro-differential equations with an oceanographical application", *J. Computational and Applied Mathematics*, 95, pp. 65-81 (1998).
12. M. S. Abou-Dina & M. A. Helal, "Boundary integral method applied to the transient, nonlinear wave propagation in a fluid with initial free surface elevation", *Applied Mathematical Modeling*, 24, pp. 535-549 (2000).
13. M. A. Helal, "Shallow water waves in a rotating rectangular basin", *Int. J. Math. & Math. Sci.*, 24, 10, pp. 649-661 (2000).
14. A. H. Khater, M. A. Helal & A. R. Seadawy, "General Soliton solutions of an n-dimensional nonlinear Schrodinger equations", *Il Nuovo Cimento (B)*, 115, 11, pp. 1303-1311 (2000).
15. M. A. Helal, "A Chebyshev spectral method for solving KdV equation with hydrodynamical application", *Chaos, Solitons and Fractals*, 12, pp. 943-950 (2001).
16. A. H. Khater, M. A. Helal, D. K. Callebaut & S. M. Moawad, "Nonlinear magnetohydrodynamic stability for axisymmetric incompressible ideal flows", *J. Plasma Physics*, 66, pp. 1-25 (2001).
17. M. A. Helal, "Soliton solution of some nonlinear partial differential equations and its applications in fluid mechanics", *Chaos, Solitons and Fractals*, 13, pp. 1917-1929, (2002).
18. M. A. Helal, "Soliton and compacton solutions for some nonlinear partial differential equations", *Proceeding of the Int. Conf. of The Egyptian Mathematical Society, Cairo-EGYPT, 28-31 December (2002)*.
19. A. M. Wazwaz and M.A. Helal, "Variants of the generalized fifth-order KdV equation with compact and noncompact structures", *Chaos, Solitons & Fractals*, 21, pp. 579- 589, (2004).
20. M. A. Helal, Aboul Ella Hassanien, Taha El-Arief, Nahla El-Haggag, "An efficient texture segmentation algorithm for isolating Iris pattern based on wavelet theory", *International Journal of Pattern Recognition and Image Analysis*, Vol. 14, No.1, pp. 97-103, (2004).
21. A. M. Wazwaz and M. A. Helal, "Nonlinear variants of the BBM equation with compact and noncompact physical structures", *Chaos, Solitons and Fractals*, 26, pp. 767-776, (2005).
22. M. A. Helal and M. S. Mehanna, "A Comparison Between two Different Methods for Solving KdV-Burgers Equation", *8th Conference on Theoretical and Applied Mechanics*,

Ministry of State for Scientific Research, Academy of Scientific Research Technology, Cairo-EGYPT, April 5-7, (2005).

23. A. H. Khater, D. K. Callebaut, M. A. Helal and A.R. Seadawy, "Variational method for the nonlinear dynamics of an elliptic magnetic stagnation line", *Eur. Phys. J. D*, 39, pp. 237-245 (2006).
24. M. A. Helal and M. S. Mehanna, "A comparison between two different methods for solving KdV– Burgers equation", *Chaos, Solitons & Fractals*, Volume 28, Issue 2, pp. 320-326 (2006).
25. M. A. Helal and M. S. Mehanna, "A comparative study between two methods for solving the general Korteweg-de Vries Equation (GKdV)", *Chaos, Solitons and Fractals*, Volume 33, Issue 3, pp. 725-739, August (2007).
26. M. A. Helal and M. S. Mehanna, "The tanh method and Adomian decomposition method for solving the foam drainage equation", *Applied Mathematics and Computation*, Volume 190, Issue 1, pp. 599-609, 1st July(2007).
27. M. A. Helal, "Tsunamis from nature to physics, Modeling and Visualization", *2nd Int. Conf. Mathematics, Trends and Developments*, Egyptian Mathematical Society, Cairo-EGYPT, December (2007).
28. M. A. Helal and M. S. Mehanna, "Tsunamis from nature to physics", *Chaos, Solitons and Fractals*, Volume 36, Issue 3, pp. 787–796, August (2008).
29. M. S. Abou-Dina and M. A. Helal, "Nonlinear internal waves", *Encyclopedia of Complexity and System Science*, pp. 6206-6214, Springer (2009).
30. M. A. Helal, " Solitons, An introduction ", *Encyclopedia of Complexity and System Science*, pp. 8504-8506, Springer (2009).
31. M. A., Helal, "Tsunamis, Generation and Mathematical Modeling", in *International Conference on Mathematics and Information Security*, Sohag University, Egypt (2009).
32. M. A., Helal, and A. R., Seadawy, "Variational mehtod for the derivative nonlinear Schrodinger equation with computational applications", *Physica Scripta*, 80 (2009).
33. M. A., Helal, "Tsunamis, Generation and Mathematical Modeling", in *Tsunamis: Causes, Characteristics, Warnings and Protection*, Veitch, N., and Jaffray, G., Eds., Nova Publisher (2010).