The order of convergence of some families of iterative methods for solving nonlinear equations

RALUCA ANAMARIA POMIAN

ABSTRACT.

We focus on some families of iterative methods. A few particular cases of these families are: Newton's method, Halley's method, Euler's method, Osculating parabola method, Chebyshev's method and others. For each families we started with a definition, we continue with particular cases and examples. For each these families we get their convergence order. We also obtain for some polynomials the attraction basins of the studied methods.

REFERENCES

- [1] Amat, S., Busquier, S. and Plaza, S., *Review of some iterative root-finding methods from a dynamical point of view*, Scientia, Series A: Mathematical Sciences, Vol. 10 (2004), 3-35
- [2] Buff, X. and Henriksen, C., On the König root-finding algorithms, Nonlinearity 16 (2003), 989-1015
- [3] Cira, O., Metode numerice pentru rezolvarea ecuațiilor algebrice, Academia Română, București, 2005
- [4] Drakopoulos, V., Schröder iteration functions associated with a one-parameter family of biquadratic polynomials, Chaos, Solitons and Fractals, 13 (2002), pp.233-243
- [5] Hasan, M. A., On the derivation of higher order root-finding methods, Proceedings of the 2007 American Control Conference Marriot Marquis Hotel at Times Square, New York City, USA, July 11-13, 2007
- [6] Osada, N., A one parameter family of locally quartically convergent zero-finding methods, Journal of Computational and Applied Mathematics, 2007, 205 (1), 116-128
- [7] Păvăloiu, I. and Pop, N., Interpolare și aplicații, Editura Risoprint, Cluj-Napoca, 2005
- [8] Petković, L. D., Petković, M. S. and Živiković, D., Hansen-Patrick's family is of Laguerre's type, Novi Sad J. Math., Vol. 33, No. 1, 2003, 109-115
- [9] Pomian, R. A., Metoda lui Newton, Didactica Matematicii, Vol. 24 (2006), 161-186

SECONDARY SCHOOL VASILE ALECSANDRI PĂŞUNII 2A 430352 BAIA MARE, ROMÂNIA *E-mail address*: raluca_pomian@yahoo.com

Received: 21.07.2007; In revised form: 10.10.2008.; Accepted:

2000 Mathematics Subject Classification. 74S30, 12D10.

Key words and phrases. Family of iterative methods, attracting fixed point, order of convergence, basin of attraction.