The aim of the course is to present the basic methods and algorithms for solving common tasks computing.

Requirements

- mathematical analysis,
- Algebra.

The lecture

1. *Analysis of errors.* Numerical arithmetic. Conditioning tasks. numerical algorithms correct.
2. *Solving nonlinear equations.* The general theory of iterative methods. Methods: bisection, Newton and Secant.
3. *Interpolation.* Pattern Lagrange interpolation. The rest of the interpolation model. Pattern Newton interpolation. Interpolation using a third degree spline functions.
4. *Approximation.* Least squares method. Discrete approximation Mean by polynomials - orthogonal polynomials, theorem *n* - the polynomial optimal. Information about uniform approximation.
5. *Quadrature.* Squaring linear. The rest of the government and quadrature. Squaring the convergence of the sequence. Quadrature interpolation. Newton-Cotes quadrature. Designs made: trapezoidal and Simpson. Romberg method. Gauss quadrature-Legandre'a.
6. *Solving systems of linear equations.* Conditioning tasks. distribution matrix square on the triangular matrix product. Gaussian elimination.

Literature

- AND. Björck, G. Dahlquist, *Numerical Methods* , PWN, 1987.
- G. Dahlquist, Å. Björck, Numerical methods in scientific computing, Vol. I, SIAM, 2008.
- M. Dryja, Ji M. Jankowski, *Overview of numerical methods and algorithms* , Man. 1 and 2, WNT, 1988.
- D. Kincaid, W. Cheney, *numerical Analysis* WNT, 2005.
- J. Stoer, R. Bulirsch, *Introduction to numerical analysis* , PWN, 1987.