MATH3476 Numerical Methods (Autumn 2019) Dr. Yue-Kin Tsang

Learning schedule

Week	Session	Content
1	30 Sept (Mon) 10–11	Introduction; Preliminaries
	3 Oct (Thu) 12–13	Lagrange interpolation (1.1.1)
2	7 Oct (Mon) 10-11	Newton divided difference (1.1.2)
	10 Oct (Thu) 12–13	Interpolation error (1.1.3)
3	14 Oct (Mon) 10–11	The \mathcal{L}_p norm (1.2.1), Weierstrass' theorem (1.2.2)
	17 Oct (Thu) 12–13	Minimax approximation (1.2.3), Error-oscillation theorems (1.2.4)
4	21 Oct (Mon) 10–11	Chebyshev polynomials (1.2.5), Chebyshev least-squares approximation (1.2.6)
	24 Oct (Thu) 12–13	Near-minimax approximation (1.2.7)
5	28 Oct (Mon) 10–11	Chebyshev interpolation (1.2.8)
	31 Oct (Thu) 12–13	Forced oscillation of the Chebyshev error (1.2.9)
6	4 Nov (Mon) 10–11	Spectrally accurate computation of rapidly decaying Fourier coefficients (1.2.10)
	6 Nov (Wed)	Finite differences in 1-D (2.1), Higher-order accuracy and/or derivatives (2.1.1)
	7 Nov (Thu) 12–13	Operator methods for 1-D finite-difference formulae (2.1.2)
7	11 Nov (Mon) 10–11	Finite-difference formulae for first derivatives (2.1.3), Finite-difference formulae for higher derivatives (2.1.4)
	13 Nov (Wed)	Finite-difference formulae in 2-D (2.2)
	14 Nov (Thu) 12–13	"Mehrstellenverfahren" for the Poisson equation (2.2.2)
8		A summeary (2.1.5), Implicit finite-difference formulae (2.1.6)
9		Higher-order approximation to the Laplacian (2.2.1), Higher-order multidi- mensional derivatives (2.2.3)
10	2 Dec (Mon) 10–11	Matrix and vector norms; spectral radius (3.1.1), Diagonal dominance and eigenvalue theorems (3.1.2)
	4 Dec (Wed)	Sparse systems of equations (3.1.3)
	5 Dec (Thu) 12–13	Direct method: LU-factorisation for tridiagonal systems (3.2.1)
11	9 Dec (Mon) 10–11	Iterative stationary methods: Jacobi, Gauss-Seidel and SOR (3.2.2), Convergence of iterative schemes (3.2.3)
	11 Dec (Wed)	The optimum relaxation parameter for SOR (3.2.4)
	12 Dec (Thu) 12–13	The optimum SOR parameter for 2-cyclic matrices (3.2.5)

Do not forget to attempt the short quizzes on Minerva after each reading assignment.