



# MAD 4401 Introduction to Numerical Analysis

## Basic Information

**Instructor:** Maia Martcheva

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**Course Meetings:** MWF 3:00-3:50 (Period 8) Lit 219

**Office Hours:** W F 9:35-10:25 (Period 3), or by appointment

## Exam Schedule:

**Midterm Exam:** March 13, 2019 (in class)

**Final Exam:** April 24, 2019 (in class)

**Quizzes:** Regular in-class quizzes will be given.

**Note 1:** You can read more details about the class from the syllabus.

**Note 2:** This is a class in which programming is expected. I prefer that you program in MATLAB. MATLAB code will be given in class and can be found in Canvas.

## Answers to Practice Final Exam:

1.  $p(x) = (x+1)^2(x-1)^2$
2. (a)  $-1 < \alpha < 1$ , (b)  $-2, 3/2$ , (c)  $-2 < \alpha < 3/2$
3. (a)  $(0, \pi/2)$ , (b) many answers possible
4. (a) will not converge, (b) will converge, (c) will converge
5. (a)  $l_{21} = 2, l_{31} = -1, l_{32} = 0, u_{11} = 2, u_{12} = 3, u_{13} = -1, u_{22} = -2, u_{23} = 1, u_{33} = 3$  (b) To solve  $Ly=b$  we need 5 MD and 3 AS, to solve  $Ux=y$  we need 5 MD, 3 AS
6.  $p(x) = a+bx+cx^2+dx^3$ , with  $a=0, b=12, c=-18, d=7$

7. (a)  $A = -\pi^3/6$ ,  $B = \pi^2/2$ , (b) approx  $-\pi^3/6$
8. (a) 2, (b) 4, (c) 3
9. (a)  $n \geq 4$
10. (a)  $L=2$ , (b)  $w_0=0$ ,  $w_{i+1} = w_i + 0.25[\text{tie}^{\{3\text{ti}\}} - 2w_i + 0.125(e^{\{3\text{ti}\}} + \text{tie}^{\{3\text{ti}\}} + 4w_i)]$
11.  $a=2/5$ ,  $b=4/5$
12. (a) proof, (b)  $O(0.25^n)$ , (c)  $n > \ln \pi^{10^2} / \ln 4$

## Useful Links

[syllabus](#)

[classnotes](#)

[past exam 1](#)

[past exam 2](#)

[past final exam](#)

[MATLAB code](#)

class slides:

[Lecture2.3](#)

[Lecture2.4](#)

[Lecture3.1](#)

[Lecture3.2](#)

