Homework and Quiz Schedule

Math 352 Differential Equations

May 6, 2013

1 Math 352 Differential Equations—Homework, reading, and quizzes

1.1 Daily homework and reading

Looking for the weekly problem sets (section 1.2) or the quizzes (section 1.3)? Or the Sage tutorial[1]? You can also download an experimental PDF[2] of this homework page.

1.1.1 Daily Problems, Week 12: May 6–May 10

- Friday, May 10: Multiple spring-mass; vibrating strings; matrix exponentials; loose ends.

- Wednesday, May 8: 2×2 systems, phase portraits, saddle points, nodes. Complex eigenvalues.

- Monday, May 6: Introduction to 2×2 systems. Download the slides[3].

1.1.2 Daily Problems, Week 11: April 29–May 3

- Friday, May 3: Advanced matrix theory: eigenvalues, eigenvectors, eigenspaces. Download the slides[4].

- Wednesday, May 1: Matrices in Sage: row operations, echelon form, augmented matrices, systems of linear equations. The Fundamental Theorem of Algebra. Download the lecture notes[5] (no slides for today).

- Monday, April 29: Exam 3. Sections 3.5–3.8.

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[1] sage.html
[2] HW.pdf
[3] SystemsOfEquations.pdf
[4] MatrixVectorEquations.pdf
[5] LinearAlgebraSage.pdf

1.1.3 Daily Problems, Week 10: April 22–April 26

- Friday, April 26: Matrix arithmetic and algebra. Read 7.2; skim 7.1. Download the Sage worksheet[6].

    - There will probably be homework assigned from outside the textbook.

- Wednesday, April 24: Forced, damped vibrations. Read section 3.8 thoroughly, including all examples and discussion. Introduction to systems of linear differential equations. Skim section 7.2, but don't worry if much seems unfamiliar. We'll augment the text.

    - Section 3.7 (quiz 4/26): 14.
    - Section 3.8 (quiz 4/26): 6, 11.

- Monday, April 22: No class.

1.1.4 Daily Problems, Week 9: April 15–April 19

- Friday, April 19: Forced oscillations, resonance.

- Wednesday, April 17: Sinusoidal vibrations in standard form: amplitude, frequency, and phase shift. Forced oscillations.

- Monday, April 15: Free harmonic oscillators. We discussed the undamped and damped cases of the harmonic oscillator problem in one dimension. Slides are forthcoming.

    - Section 3.7 (quiz 4/19): 6, 11 (find u only), 12 (refer to text)

1.1.5 Daily Problems, Week 8: April 8–April 12

- Friday, April 12: Introduced ideas from 3.7 about mechanical vibrations. Solutions[7] to Quiz 8 on undetermined coefficients. Variation of parameters group work[8] (solutions[9]) due Wednesday the 17th, not Monday as indicated.

    - Section 3.6 (quiz 4/19): 1–4, 5, 7, 9. Pay special attention to 7.

- Wednesday, April 10: Variation of parameters group work. We practiced some problems from the text.

- Monday, April 8 (quiz 4/12): Conclusion of Friday's group work (solutions[10]) and wrap-up of undetermined coefficients; introduction to variation of parameters. You can view the presentation in both the usual PDF format[11] and in an experimental HTML format[12] that may be better for mobile devices. Same goes for the presentation on variation of parameters (PDF[13]; HTML[14]).

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[6]IntroMatrixAlgebra.sws
[7]Quiz8_Solution_M352_S13.pdf
[8]GWVariationParameters_M352_S13.pdf
[9]GWVariationParameters_Solutions_M352_S13.pdf
[10]GWUndeterminedCoefficients_Solutions_M352_S13.pdf
[11]UndeterminedCoefficientsII.pdf
[12]UndeterminedCoefficientsII.html
[13]VariationParameters.pdf
[14]VariationParameters.html

1.1.6 Daily Problems, Week 7: April 1–April 5

- Friday, April 5: Read section 3.5 and skim 3.6. We had a group activity[15] today.

    - Section 3.5: Exercises 1–8.

- Wednesday, April 3: Exam 2. It covers sections 2.5 through 3.4. The best way to review is to work problems (all the way through, not just looking at them). Here are some suitable review problems. As always, they do not constitute any kind of promise about exam content. You are responsible for all the material in the indicated sections, with one exception: the last part of section 2.6, concerning integrating factors for exact equations.

    - 2.5: 9, 13, 15, 22.
    - 2.6: 1–15.
    - 2.7: 1–14; make sure you can execute Euler's method by hand (calculators ok).
    - 3.1: 9–22.
    - 3.2: 1–15.
    - 3.3: 1–22.
    - 3.4: 1–14.

- Monday, April 1: no daily problems. We had a short presentation on undetermined coefficients (the topic of section 3.5). You can view the presentation in both the usual PDF format[16] and in an experimental HTML format[17] that may be better for mobile devices.

1.1.7 Daily Problems, Week 6: March 18–March 22

- Assigned Friday, March 22. Here[18] is today's presentation.

- Assigned Wednesday, March 20. Read section 3.4 carefully, paying special attention to page 168 and to the last subsection *Reduction of Order*. Once again we had a presentation[19].

    - Section 3.4: Exercises 1–15, odd.

- Assigned Monday, March 18. Skim section 3.4. Quiz Wednesday, March 20 over 3.2., 3.3. You can also view the (short, mostly recap) presentation[20].

    - Section 3.3: Exercises 8–22, even.

1.1.8 Daily Problems, Week 5: March 11–March 15

- Assigned Friday, March 15. Read section 3.3.

    - Section 3.2: Exercises 24–27.
    - Do all of the Exercises in the Introduction to Complex Numbers[21] group assignment. You may find the presentation from today's class[22] helpful as well.

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[15]GWUndeterminedCoefficients_M352_S13.pdf
[16]UndeterminedCoefficientsI.pdf
[17]UndeterminedCoefficientsI.html
[18]ReductionOfOrder.pdf
[19]RepeatedRoots.pdf
[20]OscillatorySolutions.pdf
[21]GWComplexIntro_M352_S13.pdf
[22]IntroductionComplexNumbers.pdf

- Assigned Wednesday, March 13. Here is Wednesday's presentation about Wronskians and general solutions to second-order linear homogeneous equations[23].

    - Section 3.2: Exercises 1–6, 13, 14.

- Assigned Monday, March 11. Quiz Friday, March 15 over 2.7 and 3.1. Here is the group worksheet[24] we did about exponential solutions to a second-order linear homogeneous differential equation with constant coefficients and the superposition principle (Theorem 3.2.2 in the text.).

    - Section 3.1: Exercises 1–15 odd.

1.1.9 Daily Problems, Week 4: March 4–March 8

- Assigned Friday, March 8. You can download the Sage worksheet[25] showing how to implement Euler's Method as a loop. You'll need to upload the `.sws` file to the Sage server to open it in your account.

    - Section 2.5: Exercises 3–5, 7, 10.
    - Section 2.6: Exercises 1–3, 7.
    - Section 2.7: Exercises 1a, 3a.

- March 6: Section 2.6. No problems today.

- March 4: Exam 1.

1.1.10 Daily Problems, Week 3: February 25–March 1

- No daily problems for March 1. Exam 1 is coming up! It covers sections 2.1 through 2.4.

- Assigned Wednesday, February 27. Read section 2.5.

    - Complete the activity problems from in-class[26] to be handed in Friday in lieu of Quiz 4. No new daily problems from the text.

- Assigned Monday, February 25. Read section 2.4 and skim 2.5.

    - Section 2.4: Exercises 1–6, 7, 8. No quiz Wednesday.

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[23]WronskiansGeneralSolutions_M352_S13.pdf
[24]GWLinearSecondOrder_M352_S13.pdf
[25]EulersMethod.sws
[26]GWModeling_M352_S13.pdf

1.1.11 Daily Problems, Week 2: February 18–22

- Assigned Friday, February 22. Read section 2.3 and skim section 2.4. Work exercises 2.3.1–2.3.10.

- Assigned Wednesday, February 20. Exercises from class: 2.2.12, 22, 24, 28. Daily homework is to use Sage or another computer algebra system to plot the solutions to the IVPs. Use the plots to answer the questions about max/min and domains of solutions.

- Assigned Monday, February 18. Read section 2.2 and skim section 2.3. You can download[27] Monday's in-class Sage worksheet; ignore everything after the command consisting only of a zero. You'll need to save the `.sws` file to disk. Then, you can upload into your own Sage notebook. See the Getting Started worksheet[28] for more.

  - Section 2.2: Exercises 1–8 (all exercises) and 9–15 odd.

1.1.12 Daily Problems, Week 1: February 11–15

- Assigned Friday, February 15. Read section 2.1 and skim section 2.2.

  - Section 2.1: Exercises 1–5 and 16. To produce the plots, I suggest you make use of Sage[29]. In solving the differential equations themselves, you'll need to make heavy use of integration by parts.

- Assigned Wednesday, February 13. Read section 2.1.

  - Section 1.3: Exercises 7–9, 11, 12, 14. Work done in Sage[30] is fine (except 14), but if you feel you are a little rusty with integrals, you could probably use the practice of doing these by hand. If some of the functions involved look unfamiliar, Google them.

- Assigned Monday, February 11. Read Chapter 1. You're invited to download this Sage worksheet[31] and open it at the public Sage notebook server[32] (registration required) to experiment with slope fields. See: Getting Started with Sage[33].

  - Section 1.1: Exercises 15–20, 21, 22.
  - Section 1.2: Exercises 5–8, 12–14.

1.2 Weekly homework

Looking for the daily homework (section 1.1)?

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[27] SeparationOfVariables.sws
[28] sage.html
[29] sage.html
[30] sage.html
[31] SlopeFields.sws
[32] http://www.sagenb.org/
[33] sage.html

1.2.1 Weekly 6: April 8–April 12

Due Monday, April 15.

- Section 3.4: 28.

- Section 3.5: 9, 10.

1.2.2 Weekly 5: March 11–March 15

Due Wednesday, March 20.

- Section 2.7: 15, 19 (use of Sage is encouraged).

- Section 3.1: 20, 24.

1.2.3 Weekly 4: March 4–March 8

Due Wednesday, March 13.

- Section 2.5: 15. I encourage you to make use of Sage, although this problem should not be as challenging as some of the 2.3 problems to do by hand. It will help a lot if you think about part (a) in verbal context. What is the meaning of K? What is the meaning of τ? How do α, β, etc., correspond to numbers in part (a)? Put some effort into understanding the problem before you begin to solve it.

- Section 2.6: 12, 16.

1.2.4 Weekly 3: February 25–March 1

Due Monday, March 4.

- Section 2.4: exercises 22, 23, 25, 26.

1.2.5 Weekly 2: February 18–February 22

Due Monday, February 25.

- Section 2.2: exercises 10–16 (even; use Sage or equivalent for plots)

- Section 2.3: exercises 13, 18, 19.

1.2.6 Weekly 1: February 11–February 15

Due Monday, February 18.

- Section 2.1: exercises 13, 15, 17, 19.

1.3   Quiz dates

- Quiz 10: Friday, April 26 (sections 3.7, 3.8).

- Quiz 9: Friday, April 19 (sections 3.6, 3.7).

- Quiz 8: Friday, April 12 (section 3.5).

- Quiz 7: Wednesday, March 20 (sections 3.2, 3.3).

- Quiz 6: Friday, March 15 (sections 2.7, 3.1).

- Quiz 5: Wednesday, March 13 (sections 2.5, 6).

- Quiz 4: Monday, February 25 (section 2.3).

- Quiz 3: Wednesday, February 20 (section 2.2). This and all subsequent quizzes will be open-note, but no books or calculators.

- Quiz 2: Friday, February 15.

- Quiz 1: Wednesday, February 13.