MATH 302-010 Ordinary Differential Equations
Prof. D. A. Edwards Dec. 6, 2024

Updates

1. Since classes end today, I cannot require you to complete another homework set. However, these are the problems I would have assigned for homework, so they should give you an idea of the concepts that I consider to be important. Solutions will be posted online this afternoon.
2. I will hold an informal review session for the final Friday, Dec. 13 from 10–12 **in PRN 327**.
3. The final exam will be administered Sunday, Dec. 15 from 11:30–1:30 **in GOR 204**. You will need to bring a small blue book, as well as your laptop.
4. Be sure to log on to `http://www.udel.edu/course-evals/` to complete your UD course evaluations.
5. Teacher evaluations may also be given at `ratemyprofessors.com` using the QR code at right.

Supplemental Study Material (Revised)

Read sections 10.4, 10.5, and 11.1.

Section 10.4

1. Consider the function

$$f(x) = \begin{cases} \sin x, & 0 < x < \pi/2, \\ 1, & \pi/2 < x < \pi. \end{cases}$$

   (a) (MP) Graph the function for $x \in [0, \pi]$.
   (b) (BH) Compute the Fourier sine series for $f(x)$. Once you have done the integrals, discuss the cases of odd and even n separately, as well as any special cases.
   (c) (MP) Check your answer with Mathematica up to $n = 5$.
   (d) (MP) Plot your answer up to $n = 15$.

Sections 10.5/11.1

2. Consider the following system:

$$\frac{\partial \theta}{\partial t} = \frac{\partial^2 \theta}{\partial x^2}, \quad 0 \le x \le 1; \qquad \theta(0,t) = \frac{\partial \theta}{\partial x}(1,t) = 0.$$

(a) (BH) Separate variables, and find λ_n, $X_n(x)$, and $T_n(t)$.