

# Math 135 Ordinary Differential Equations

Homework 6

May 13, 2022

## Fourier Series:

1. Section 37: Problem 3
2. Section 37: Problem 5
3. Section 38: Problem 1
4. Section 38: Problem 4
5. Section 38: Problem 7
6. Let  $V$  be a real inner product space and let  $v, w \in V$  be non-zero.
  - a) Let  $J(t) = \|v - tw\|^2$  for  $t \in \mathbb{R}$ . Find the value of  $t$  (in terms of  $v, w$ ) that minimizes  $J$ .
  - b) What does your result from part (a) tell you about the projection  $P_W(v) = \frac{\langle w, v \rangle}{\|w\|^2} w$  of  $v$  onto  $W$  (the span of  $w$ )?