

Math 118 – Week 11
Fall Term 2003
BUCKMIRE

Monday November 3 *Class 26:*

We will look at examples of nonlinear oscillations, which can usually be obtained from modifications to the linear oscillator model.

Homework #17 (4 points):

1. Consider the initial following nonlinear oscillator IVP

$$\begin{aligned}x' &= v \\v' &= -b^2x - \beta x^3 \\x(0) &= a \\v(0) &= p\end{aligned}$$

- (a) Show that $E(t) = \frac{1}{2}v^2 + \frac{1}{2}b^2x^2 + \frac{1}{4}\beta x^4$ is a first integral of the IVP above.
- (b) Write down an expression for the exact value of E as $t \rightarrow \infty$ (HINT: this should involve parameters from the IVP.)
- (c) What is the value of v when $x = 0$?

Due: Class 27

Wednesday November 5 *Class 27:*

Introduction to Taylor Polynomials.

Reading:

Smith & Minton, p. 682–694

Homework #18 (6 points):

Smith & Minton, page 694–695: 28, 32, 54

Due: Class 28

Thursday November 6 Lab #8: Investigating Taylor Polynomials

Lab #7 Trigonometric Functions DUE

Friday November 7 *Class 27:*

We shall analyze the error terms in Taylor Polynomial approximations.

Reading:

Smith & Minton, Section 8.7

Homework:

Quiz #9:

Due: Class 28