

## Assignment 3 for MTH G131: Fall 2006

**Due date:** Wednesday September 27.

**Reading:** Chapter 1 in Logan; also review Taylor polynomials from any undergraduate calculus text.

### **1). Taylor polynomials**

Compute Taylor polynomials of these functions to the stated order at the given point:

(i)  $\ln(1 + x)$ , fourth order at  $x = 0$

(ii)  $\sqrt{x}$ , third order at  $x = 1$

(iii)  $(x - 3)^{-2}$ , third order at  $x = 1$

### **2). Remainder estimates**

a) Derive the fifth order Taylor polynomial  $P_5(x)$  for the function  $\sin(x)$  at  $x = 0$ .

b) Use the remainder formula for the Taylor polynomial to find the number of decimal places of accuracy of the formula  $\sin(x) \simeq P_5(x)$  for values of  $x$  satisfying  $|x| \leq 0.1$ .

### **3). Models**

a) Logan, p.39, #5.

b) Logan, p.40, #12.

### **4). Bifurcation diagrams**

a) Logan, p.44, #3.

b) Logan, p.44, #4.