MATH 206 Homework 4

Due Date of the Homework is 9 April, 2008.

1. Write a MATLAB function, which finds first N coefficients of the Taylor series expansion of f(z) about a point z_0 taking as inputs f(z), z_0, N and the disk radius R_0 which you must specify properly. You may use "taylor()" function in MATLAB for only checking your results. You may use "taylor()" function in MATLAB for only checking your results. MATLAB Function should look like this: taylor_coef(f,z0,R0,N).

a. $f(z) = log(1 + \cos(z)), |\cos(z)| < 1$, N = 2, $z_0 = 1 + i/2$

b. $f(z) = z^2 cosh(z),\ |z| < \infty$, N = 3, $z_0 = 2 + i$

2. Write a MATLAB function, which finds first N coefficients of the Laurent series expansion of f(z) about a point z_0 taking as inputs f(z), z_0, N and the annular region radii R_1, R_2 which you must specify properly. MATLAB Function should look like this: laurent_coef(f,z0,R1,R2,N).

a. $f(z) = exp\left(\frac{1}{z-i}\right)$, N = -2:0, $z_0 = i$

b. $f(z) = z^2 sin\left(\frac{1}{z^2}\right)$, N = -4:0, $z_0 = 0$

Hint: The outputs of the functions can be in symbolic form, so, you can use functions "simple, simplify, pretty, vpa, etc." to show your results in a nice format. Also, you can use "subs" function for evaluating integrals. You can find the usage of these functions from the Help documentation of MATLAB.