Homework Problem Set #6

(Due by 2008/06/02)

This problem set covers the content of Lessons 11−13 or EK 15−16.3.

1)   (5%) Problem **15.2.1**.

2)   (5%) Find the region of convergence for $\displaystyle\sum_{n=0}^{\infty} \frac{n^n}{3^n \cdot n!}(z-i)^n$.

3)   (5%) Problem **15.2.20(d)**.

4)   (10%) Problem **15.3.10**. (Using two methods specified by the problem, respectively.)

5)   (5%) Problem **15.3.14**.

6)   (20%) Problem **15.3.20(a,c)**.

7)   (5%) Problem **15.4.14**.

8)   (10%) Find the Taylor series of (Ln z) centered at $z_0 = -1 + I$, and its radius of convergence R. What is the distance d between z_0 and the nearest singularity of Ln z? Whether $R = d$?

9)   (10%) Problem **16.1.7**.

10) (10%) Let $f(z) = \dfrac{1}{z^3} + \dfrac{1}{z^4} + \dfrac{1}{z^5} + \ldots$, what type of singularity (mth-order pole or essential

singularity) is for $z=0$? (*Hint*: intuition might be incorrect.)

11) (5%) Evaluate $I = \oint_C \dfrac{e^z}{z(z+1)} dz$, where C: $|z-1|=3$. (*Hint*: Using residue integration.)

12) (10%) Problem **16.3.22**.