18.04 Recitation 7
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1. Compute the Laurent series for $f(z) = \frac{z+1}{z^3(z^2+1)}$ on the region $A : 0 < |z| < 1$ centered at $z = 0$.

2. Find the Laurent series around $z = 0$ for $f(z) = \frac{1}{z(z-1)}$ in each of the following regions:

2.1. The region $A_1 : 0 < |z| < 1$

2.2. The region $A_2 : 1 < |z| < \infty$.

3. Suppose $f(z)$ is an analytic function on the unit disk such that $f(w) = 5$ for all $w \in \{x + i0 : -0.2 \le x \le 0.2\}$. What is $f(i/2)$? Does your answer change if instead the assumption is that $f(w) = 5$ for all $w \in \{x - 3i/4 : -0.2 \le x \le 0.2\}$?

4. Find a power series solution to the differential equation $f'(x) = f(x) + 2$ with $f(0) = 0$.

18.04 Complex Variables with Applications

Spring 2018