Complex Analysis

Assignment 4, due February 11

Problem 1 of 5.

(1) Prove that any open subset of the complex plane has at most countably many connected components.

(2) Give an example of a closed subset of the complex plane with uncountably many connected components.

Problem 2 of 5. Problem 3, page 72 of *Ahlfors*.

Problem 3 of 5. Let C be a circle, and z_1, z_2 be two complex numbers, $z_1 \notin C$, $z_2 \notin C$. Show that there exists unique Möbius map S such that $S(C) = C$, $S(z_1) = z_2$, $S'(z_1) > 0$.

Problem 4 of 5.

(1) Problem 6, page 83 of *Ahlfors*.

(2) Problem 7, page 83 of *Ahlfors*.

(3) Find all the circles which are orthogonal to both of the circles $|z| = 1$ and $|z - 1/2| = 1/4$.

Problem 5 of 5. Problem 3, page 88 of *Ahlfors*.