MATH 2250, Fall 2010.
Homework assignment, Nov. 10, 2010

1. Let $\Omega = \{z \in \mathbb{C} : 0 < |z| < 1\}$, and let h be a function on $\partial\Omega$ defined by

$$h(z) = \begin{cases} 1 & |z| = 1; \\ 0 & z = 0 \end{cases}$$

Let $\mathcal{F} = \mathcal{F}(h)$ be the collection of all subharmonic in Ω functions v, such that for all $\xi \in \partial\Omega$

$$\limsup_{z \to \xi} v(z) \le h(z).$$

Compute the function u on Ω,

$$z(z) = \sup\{v(z) : v \in \mathcal{F}\}, \qquad z \in \Omega.$$

2. Show that maximum of two upper semicontinuous functions is upper semicontinuous.