1035-31-1818 **Mohammad Javaheri*** (javaheri@uoregon.edu), Department of Mathematics, University of Oregon, Eugene, OR 97403. *Harmonic functions via restricted mean-value theorems.*

Let $f$ be a function on a bounded domain $\Omega \subseteq \mathbb{R}^n$ and $\delta$ be a positive function on $\Omega$ such that $B(x, \delta(x)) \subseteq \Omega$. Let $\sigma(f)(x)$ be the average of $f$ over the ball $B(x, \delta(x))$. The restricted mean-value theorems discuss the conditions on $f, \delta$, and $\Omega$ under which $\sigma(f) = f$ implies that $f$ is harmonic. In this paper, we study the stability of harmonic functions with respect to the map $\sigma$. One expects that, in general, the sequence $\sigma^n(f)$ converges to a harmonic function. Among our results, we show that if $\Omega$ is strongly convex (respectively $C^{2,\alpha}$-smooth for some $\alpha \in [0,1]$), the function $\delta(x)$ is continuous, and $f \in C^0(\overline{\Omega})$ (respectively, $f \in C^{2,\alpha}(\overline{\Omega})$), then $\sigma^n(f)$ converges to a harmonic function uniformly on $\overline{\Omega}$. (Received September 20, 2007)