1010-41-57 **Yingkang Hu*** (yhu@georgiasouthern.edu), Dept. of Mathematical Scienses, PO BOX 8093, Georgia Southern University, Statesboro, GA 30460, and **Yongping Liu**. *On Equivalence of Moduli of Smoothness of Polynomials in L_p, $0 < p \leq \infty$.*

It is well-known that $\omega^r(f,t)_p \leq t\omega^{r-1}(f',t)_p \leq t^2\omega^{r-2}(f'',t)_p \leq \cdots$ for functions $f \in W_p^r$, $1 \leq p \leq \infty$. For general functions $f \in L_p$, it does not hold for $0 < p < 1$, and its inverse is not true for any p in general. It has been shown in the literature, however, that for certain classes of functions the inverse is true, and the terms in the inequalities are all equivalent. Recently, G. Z. Zhou and S. P. Zhou proved the equivalence for polynomials with $p = \infty$. Using a technique by Z. Ditzian, V. H. Hristov and K. G. Ivanov, we give a simpler proof to their result and extend it to the L_p space for $0 < p \leq \infty$. We then show its analogues for the Ditzian-Totik modulus of smoothness $\omega_\phi^r(f,t)_p$ and the weighted Ditzian-Totik modulus of smoothness $\omega_\phi^r(f,t)_{w,p}$ for polynomials with $\phi(x) = \sqrt{1-x^2}$. (Received August 16, 2005)