1073-35-188 **M Burak Erdogan***, Department of Mathematics, University of Illinois, Urbana, IL 61801, and **Nikos Tzirakis**, Department of Mathematics, University of Illinois, Urbana, IL 61801. *Smoothing for the KdV equation with periodic boundary conditions.*

We consider the Korteweg-de Vries (KdV) equation with periodic boundary conditions. We prove that for $H^s$ initial data, $s > -1/2$, and for any $s_1 < \min(3s+1, s+1)$, the difference of the nonlinear and linear evolutions is in $H^{s_1}$ for all times, with at most polynomially growing $H^{s_1}$ norm. The result also extends to KdV with a smooth, mean zero, time-dependent potential in the case $s \geq 0$.

A corollary of this result and a theorem of Oskolkov state that if one starts with continuous and bounded variation initial data then the solution of KdV is a continuous function of space and time.

Another corollary is the smoothing for the modified KdV equation on the torus for $s > 1/2$. (Received August 01, 2011)