Meeting: 999, Nashville, Tennessee, SS 11A, Special Session on Nonlinear Partial Differential Equations and Applications

999-35-181 **Hongqiu Chen*** (hchen1@Memphis.edu), Dept. of Math, Statistics and Computer Scien, University of Illinois at Chicago, Chicago, IL 60607. *Travelling wave solutions of nonlinear dispersive wave equations.*

Considered here is a class of nonlinear dispersive wave equations from fluid mechanics and written in non-dimensional form:

$$u_t + u_x - Lu_x + u^{p-1}u_x = 0 \tag{1}$$

where $u = u(x,t)$, $x \in \mathbb{R}$, $t \geq 0$, $p \geq 2$ is an integer and L is a linear operator defined through its Fourier transform $\widehat{Lv}(\xi) = \alpha(\xi)\widehat{v}(\xi)$. I am interested in travelling wave solutions in frame $u(x,t) = u(x-ct)$ where $c > 1$ is wave propagation speed. The result is that if $\alpha(0) = 0$, $\alpha(-\xi) = \alpha(\xi) \geq 0$, α is monotone increasing on $[0,\infty)$, and there is an $s > \frac{1}{2} - \frac{1}{2p}$ such that $0 < \liminf_{\xi\to\infty} |\xi|^{-2s}\alpha(\xi) < \infty$, then (1) has solitary wave solutions $u \in H^\infty(\mathbb{R})$ and periodic travelling wave solutions $u \in C^\infty(\mathbb{R})$ with period l if $l > 0$ is chosen sufficiently large. (Received August 23, 2004)