



# SEMINÁRIO DE EQUAÇÕES DIFERENCIAIS

On regularity and decay of the solutions to a Liquid Crystal  
system

HONGQIU CHEN

University of Memphis, Memphis, Tennessee, USA

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**Resumo:** The focus of the current paper is the higher order nonlinear dispersive equation

$$u_t + u_x - \frac{1}{6}\beta u_{xxt} + \delta\beta^2 u_{xxxxt} + \frac{3}{4}\alpha(u^2)_x \\ + \alpha\beta\left(\gamma(u^2)_{xx} - \frac{1}{12}u_x^2\right)_x - \frac{1}{4}\alpha^2(u^3)_x = 0$$

which models unidirectional propagation of small amplitude long waves in dispersive media. The dependent variable  $u = u(x, t)$  is a real-valued function of  $x, t$ . It represents the deviation of the free surface relative to its undisturbed state at the space point  $x$  and at time  $t$ . The subscripts connote partial derivatives while  $\delta, \alpha, \beta > 0, \gamma \in \mathbb{R}$  are modeling constants.

The specific interest of this talk is in the initial-boundary value problem where both spatial and time variables lie in  $\mathbb{R}^+$ , namely, quarter plane problem. With proper requirement on initial and boundary condition, we show local and global well posedness.