

1096-35-1641

Nathan Glatt-Holtz and **Roger Temam** (wang211@umail.iu.edu), Bloomington, IN 47408, and **Chuntian Wang*** (wang211@umail.iu.edu), Rawles Hall, 831 East 3rd St, Bloomington, IN 47405. *A Hyperbolic Model from Plasma Physics: The Zakharov-Kuznetsov Equation.*

The Zakharov-Kuznetsov (ZK) equation, a model arising from plasma physics, is a 2 or 3D wave equation of the family of the Korteweg-de Vries (KdV) equations. Recently the ZK equation has attracted considerable attention because it is closely related with the physical phenomena and contributes to the understanding of more general problems that are partly hyperbolic (such as the inviscid primitive equations).

In this talk, we present some recent mathematical results concerning the ZK equation in a bounded domain motivated by the study of boundary control problems. New difficulties arise; firstly, the linear operator associated with this model is neither symmetric nor coercive and has an anisotropic structure. Secondly, new technical tools have been developed to deal with the boundary conditions. Thirdly the proof of uniqueness of weak solutions provides an idea of how to deal with the lack of regularity of the difference of the solutions.

We will also discuss recent works of extending the ZK equation to the stochastic case, in the effort of capturing more realistic physical phenomena.

These are the joint works with R. Temam, N. Glatt-Holtz and J-C. Saut.

(Received September 16, 2013)