1085-76-140   **Jean-Claude Saut**, Bat. 425, 91405 Orsay, France, **Roger Temam**, Rawles Hall, Bloomington, IN 47405-5701, and **Chuntian Wang*** (`wang211@umail.iu.edu`), Rawles Hall, 831 East 3rd St, Bloomington, IN 47405. *An initial and boundary-value problem for the Zakharov-Kuznestov equation in a bounded domain.*

Motivated by the study of boundary control problems for the Zakharov-Kuznetsov equation, we study in this article the initial and boundary value problem for the ZK equation posed in a limited domain $\Omega = (0,1)_x \times (-\pi/2, \pi/2)^d$, $d = 1, 2$. This article is related to the previous work (Jean- Claude Saut and Roger Temam, *An Initial boundary-value problem for the Zakharov-Kuznetsov equation"*, Adv. Differential Euqations 15 (2010), no. 11-12, 1001-1031. MR 2743493), in which the authors studied the same problem in the band $(0,1)_x \times \mathbb{R}^d$, $d = 1, 2$, but this article is not a straightforward adaptation of the previous work; indeed many new issues arise, in particular for the function spaces, due to the loss of the Fourier transform in the tangential directions (orthogonal to $0x$).

In this article, after studying a number of suitable function spaces, we show the existence and uniqueness of solutions for the linearized equation using the linear semigroup theory. We then continue with the nonlinear equation with the homogeneous boundary conditions. The case of the full nonlinear equation with nonhomogeneous boundary conditions especially needed for the control problems will be studied elsewhere. (Received September 06, 2012)

1