ICM 1998, Berlin, Aug. 18–27

Abstracts of Short Communications and Posters

Section:

10. Partial Differential Equations

1991 MS Classification:

Kiguradze, Tariel, Tbilisi I. Javakhishvili State University, Georgia

On periodic solutions of nonlinear second order hyperbolic equations

$$u_{tt} - u_{xx} = g_0(u) + g_1(u)u_t + g_2(u)u_x + g(t,x,u) \qquad (1)$$

is considered, where $g_i : R \to R$ $(i = 0,1,2)$ and $g : R^3 \to R$ are continuously differentiable functions and $g(t+\omega_1, x, z) \equiv g(t,x,z) \equiv g(t, x+\omega_2, z)$. The sufficient conditions are found under which this equation has a solution u such that

$$u(t+\omega_1, x) = u(t,x), \quad u(t, x+\omega_2) = u(t,x). \qquad (2)$$

In particular, it is shown that if following conditions take place

$$g_i(z) \geq 0 \ \ (i = 1,2), \quad \inf\{z \in R : g_1(z) - g_2(z)\} > 0, \quad \liminf_{|z| \to +\infty} g_0((z) < 0,$$

$$\lim_{|z| \to +\infty} \frac{g^2(x,y,z)}{g_0(z)} = 0 \ \text{ uniformly with respect to } \ (t,x) \in R^2,$$

then problem (1), (2) has at least one solution.