

RECONSTRUCTION OF COEFFICIENTS OF HIGHER ORDER NONLINEAR WAVE EQUATIONS BY SOLITARY WAVES

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In this talk we consider inverse problems to recover coefficients of the fifth order Korteweg - de Vries (KdV) equation

$$v_t + \alpha_1(v^2)_x + \alpha_2v_{xxx} - \alpha_3v_{xxxxx} = 0,$$

sixth order generalized Boussinesq equation (SGBE)

$$v_{tt} = \beta_1v_{xx} + \beta_2(v^2)_{xx} - \beta_3v_{xxxx} + \beta_4v_{xxxxx}$$

and two sixth order equations

$$v_{tt} = \mu_1v_{xx} + \mu_2(v^2)_{xx} + (\mu_3v_{tt} - \mu_4v_{xx})_{xx} - (\mu_5v_{tt} - \mu_6v_{xx})_{xxxx}$$

and

$$v_{tt} = \lambda_1v_{xx} + \lambda_2(v^2)_{xx} + (\lambda_3v_{tt} - \lambda_4v_{xx})_{xx} - (\lambda_5v_{ttt} - \lambda_6v_{ttxx} + \lambda_7v_{xxxx})_{xx}$$

occurring in the dynamics of multiscale microstructure.

We use characteristics of solitary waves for solving these problems. Also we prove the uniqueness of the solutions and provide solution algorithms.

REFERENCES

- [1] J. Janno, A. Šeletski. Reconstruction of coefficients of higher order nonlinear wave equations by measuring solitary waves. *Wave Motion*, **52** 15-25, 2015.