Nonuniform lossless transmission lines terminated by a nonlinear conductive element

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The present paper is devoted to the investigation of lossless transmission lines with varying in time and space specific parameters terminated by nonlinear conductive loads with interval of negative resistance. Such systems are more complicated in comparison of known Telegrapher equations. We introduce conditions which guarantee distortionless propagation along the line. We present a general method of reducing the mixed problem for the arising hyperbolic system to an initial vale problem for neutral system on the boundary with time depending delays. Here we overcome difficulties arising from variable specific parameters and formulate conditions for the existence of oscillatory solutions.