



Nonlinear Farley-Buneman Instability Near Threshold Conditions

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The equation governing the nonlinear evolution of density fluctuations in a low-pressure weakly ionized plasma, current or pressure-driven unstable, constitute an archetype for as far as nonlinear dynamics is concerned. We are primarily interested in the nonlinear development of the Farley-Buneman waves instability, as it occurs in the ionospheric E region, and near instability threshold. We will calculate the wave saturation level and discuss its dependence on the “distance” to the instability threshold to try and identify a “soft” nonlinear regime as opposed to hard nonlinear regime with a saturation level completely independent of the distance to the threshold. We will discuss the behavior of the amplitude of the waves in both regimes.