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Interfacial Instabilities Due to Evaporation and Convection: Nonlinear Analysis. WEIDONG GUO, Department of Chemical Engineering, University of Florida, Gainesville, RANGA NARAYANAN, Department of Chemical Engineering, University of Florida — Evaporative and convective instabilities in two phase systems arise in a variety of industrial processes, such as drying of films and in coating technology. Past theories assume either a passive vapor layer or unbounded geometries. We have investigated the evaporative convection by taking into account the fluid dynamics of both liquid and vapor phases as well as rigid side wall conditions. The base state is one of zero evaporation flux and two cases are considered; one where the upper wall and lower walls allow mass flux and another where the top and bottom walls are made impermeable. The onset and post onset regions are studied. The nature of the bifurcation as well as the change in mass and heat flux in the nonlinear regime are determined.

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