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**Nonlinear Dynamics of Film Blowing Process: Multiplicity, Bifurcation and the Transient Solutions**

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The nonlinear dynamics of film blowing process has been investigated both theoretically and experimentally to reveal many interesting dynamic characteristics of the system in terms of the stability and multiplicity of the solutions. In particular, transient solutions have been obtained for the first time in more than thirty years since the seminal paper by Pearson and Petrie in 1970, introducing several numerical schemes for solving the hitherto unsolved moving-boundary-value partial differential equations. The linear stability analysis has also been carried out to confirm the intricate nature of the stability picture of the process, and interesting bifurcation diagrams have been obtained to illustrate the multiplicity of the solutions, quite reminiscent of the well-known multiple solutions of the dynamics of a continuous stirred tank reactor. The simulation model exhibits the pictures of the film bubble shape portraying the dynamic pictures of LDPE and HDPE film blowing, remarkably similar to experimentally obtained ones even during the instability called draw resonance.