Bifurcating Solutions for the Mathematical Model of Dry Slag Atomization

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Abstract

Bifurcation of the numerical solution for a system of nonlinear equations describing the industrial process of dray slag atomization is presented. In dry slag atomization, a stream of molten slag is disintegrated by impingement of a high speed jet of air, resulting in a spray of molten slag droplets. The main output of the equations is the Sauter mean diameter of the spray droplets. Oneparameter bifurcation diagrams are generated for two of the operating parameters, liquid and air flowrates. In both cases, two solutions exist for the system of equations. At least one of the solutions corresponds to the stable steady state of the system. The other solution can be associated with the unstable state of the system.

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