

Traveling Wave DAEs in Spray Dynamics

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We analyze a system of quasilinear DAEs describing traveling wave solutions in the gas-liquid atmosphere of spray dynamics. The system is of the form $A(y)y' = h(y)$ where $A(y)$ and $h(y)$ depend on the parameters and dissipative mechanisms involved. Several interesting singular points are naturally present in these DAEs, including both the *algebraic* and *geometric* singularities of various kinds. The singularity crossing phenomenon for the *geometric* singularities is discussed within the framework of the singularity induced bifurcation theorem. Several illustrative examples are included.

This is joint work with Tewodros Amdeberhan.