Electrohydrodynamic instability of a suspended liquid film MO-
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nia San Diego — Electrohydrodynamic instabilities at liquid-liquid interfaces are
of high importance due to their relevance in various microfluidic applications. In
this work, we analyze the stability of a system of three superposed layers of two
immiscible liquids subject to a normal electric field. Following the leaky-dielectric
model, the interfaces admit free charge while the bulk remains electroneutral. Inter-
facial charge dynamics is captured by a conservation equation accounting for Ohmic
conduction, advection by the flow, and finite charge relaxation. We use this model
to perform a linear stability analysis and uncover regimes of instability in terms of
the relevant dimensionless groups of the problem.

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