Geometric optics for hyperbolic free boundary problems

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Talk Abstract

In this talk we discuss the geometric optics approach for the construction of weakly nonlinear, highly oscillating solutions to some free boundary problems in Fluid Dynamics and MHD. The analysis depends on the nature of the roots of the Lopatinskii determinant associated to the problem. As evidenced in earlier works, for problems where the Lopatinskii determinant vanishes at an *elliptic* frequency, high frequency oscillations may give rise to surface waves on either side of the free boundary that decay exponentially in the normal direction. Such a case occurs for current-vortex sheets and the plasma-vacuum interface problem in MHD. In other problems where the Lopatinskii determinant vanishes at an *hyperbolic* frequency, such as detonation waves or compressible vortex sheets, there occur non-decaying radiative surface waves that generate bulk waves propagating away from the boundary into the interior of the space domain.

References

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