The singularity of a perfect gas at the vacuum boundary

Denis Serre

École Normale Superieure Lyon, France

Resumo/Abstract:
Tai-Ping Liu investigated a decade ago the singularity that a perfect gas may develop at some parts of the interface that separates the gas from vacuum. We show that a natural assumption, involving the sign of an integral of the initial data, implies the development of this singularity for a compactly supported gas. In particular, in odd space dimension, an eternal solution cannot be a smooth one ; this completes an old work of Magali Grassin and I, which proved the opposite result in the even dimensional case. We interpret this boundary singularity as the limit of a shock wave as the density vanishes.