Geometrical shock dynamics of fast magnetohydrodynamic shocks[1] WOUTER MOSTERT, DALE I. PULLIN, Graduate Aerospace Laboratories, California Institute of Technology, RAVI SAMTANEY, Mechanical Engineering, King Abdullah University of Science and Technology, VINCENT WHEATLEY, School of Mechanical and Mining Engineering, University of Queensland — We extend the theory of geometrical shock dynamics (GSD, Whitham 1958), to two-dimensional fast magnetohydrodynamic (MHD) shocks moving in the presence of nonuniform magnetic fields of general orientation and strength. The resulting generalized area-Mach number rule is adapted to MHD shocks moving in two spatial dimensions. A partially-spectral numerical scheme developed from that of Schwendeman (1993) is described. This is applied to the stability of plane MHD fast shocks moving into a quiescent medium containing a uniform magnetic field whose field lines are inclined to the plane-shock normal. In particular, we consider the time taken for an initially planar shock subject to an initial perturbed magnetosonic Mach number distribution, to first form shock-shocks.

Wouter Mostert
Graduate Aerospace Laboratories, California Institute of Technology