Non-Local Property of a Hall-MHD Contact Discontinuity[1]
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a transport barrier or a plasma-vacuum interface. One outstanding question con-
cerning such a discontinuity is whether, in a two-fluid plasma, the electron fluid is
allowed to cross the discontinuity even if the ion fluid does not (because of the "con-
tact" nature). Indeed we find that such a situation is possible in Hall-MHD, implying
that the discontinuity problem is a global problem where in order to preserve charge
neutrality in the volume bounded by the contact discontinuity, electrons leaving the
volume at one point have to be compensated for by electrons crossing in the oppo-
site direction at another point. We carry out a full linear treatment of a toroidal
plasma, deriving also stability criteria that conflict with some previous results[1,2]
which ignored the issue of non-locality and its implication for the appropriate jump
conditions.

1. U. Schaper, J. Plasma Phys. **30**, 169 (1983).

2. P. Rosenau et al., J. Plasma Phys. **21**, 385 (1975).

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