Improved energy principle for a linear stability of moving plasma

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SMOLYAKOV, University of Saskatchewan — The way of how to improve the energy
principle for linear MHD stability of three-dimensional, inhomogeneous, compress-
ible, moving plasma is suggested. The key point of the analysis is the accounting
for a new set of integrals inherent in the linearized plasma dynamics that was not
earlier discussed in the literature. Sufficient stability condition for flowing plasma
is obtained. The condition appears to be softer (easier to be satisfied) than all pre-
viously known variational stability conditions. Analytical example is presented to
demonstrate the use of the method for usual fluid rotating around a gravity center
(accretion disc). In this case, the obtained stability condition is shown to be both
necessary and sufficient that confirms the fruitfulness of the suggested approach.

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