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More about the influence of the total pressure on the MHD stability of two-dimensional magnetotail-like configurations

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MHD stability of two-dimensional magnetotail-like configurations to cross-tail transversal mode is considered by means of 2.5-dimensional numerical simulations. Background equilibria for symmetrical and bent current sheets are provided by generalized Kan-like analytical model. It is found that the solution is governed by the second derivative of total pressure on the coordinate along the normal-to-the-sheet direction. Namely, if this quantity is strictly positive, the solution has a form of propagating flapping-like wave. If it is negative, sheet is unstable and solution is growing exponentially, and if derivative is alternating-sign, both solutions present. Spatial localization of stable / unstable modes is controlled by localization of corresponding extremums of the derivative, divided by mass density; and the values of extremums control the mode frequency / growth rate. Numerical solutions may be approximated by the solution of single one-parametric modeling equation, generalizing the original double-gradient model.