J. Plasma Physics (1975), *vol.* 14, *part* 3, *pp.* 551–552
Printed in Great Britain

CORRIGENDUM

'On effects of neutral gas friction and ion viscosity on the Rayleigh–Taylor instability of a stratified plasma in the presence of Hall currents'

By P. K. Bhatia,

J. Plasma Phys. vol. **11**, 1974, pp. 1–10

Bhatia (1974) investigated the effects of neutral gas friction and ion viscosity on the dynamical stability of a composite plasma of variable density in the presence of the effects of Hall currents. To the relevant linearized hydromagnetic perturbation equations, the usual normal-mode technique was applied, and a variational principle was shown to characterize the problem. Based on this, the solution was obtained for a plasma in which density varies exponentially along the vertical (i.e. normal to the ambient magnetic field), and the following dispersion relation was derived (Bhatia 1974, (38)):

$$\left(nn' - \frac{g\beta k^2}{l^2+k^2} + n\nu_0(l^2+k^2)\right) + k_x^2 V^2 \left[1 + \frac{(cH_0/4\pi Ne)^2 k_x^2(l^2+k^2)\{n'+\nu_0(l^2+k^2)\}}{nk_x^2V^2 + n^2\{n'+\nu_0(l^2+k^2)\}}\right]^{-1} = 0. \qquad (1)$$

On simplification, the dispersion relation becomes a seventh-degree polynomial in n. In terms of the non-dimensional quantities introduced in Bhatia (1974, (1)) can be expressed in the symbolic form (Bhatia 1974, (40))

$$y^7 + A_6y^6 + A_5y^5 + A_4y^4 + A_3y^3 + A_2y^2 + A_1y + A_0 = 0. \qquad (2)$$

Due to an oversight, a couple of terms involving A (Hall current parameter) in the coefficients A_2 and A_3 were reported somewhat wrongly. We point out these omissions, particularly as they *alter* the dependence of the growth rate on neutral gas friction. The corrections to the coefficients A_2 and A_3 are respectively

$$Ax^2(1+x^2)^2\cos^2\theta[S^2(1+x^2)+NS(4+2\alpha)]$$

instead of

$$Ax^2(1+x^2)^2\cos^2\theta[S^2+NS(3+2\alpha)],$$

and

$$2Ax^2\cos^2\theta NS(1+x^2)^2[(1+\alpha)N+S(1+x^2)]$$

instead of

$$Ax^2\cos^2\theta NS(1+x^2)^2[(2+\alpha)N+S(1+x^2)].$$

Numerical calculations of (2) were again performed for several values of the parameters involved, and these are presented in figure 1. It is easily seen from the graph that the growth rate decreases as N (neutral gas friction) increases. The influence of the neutral gas friction is, therefore, *stabilizing* (and not *destabilizing*, as reported in Bhatia 1974). The effect of ion viscosity is, of course, the same (i.e. stabilizing).

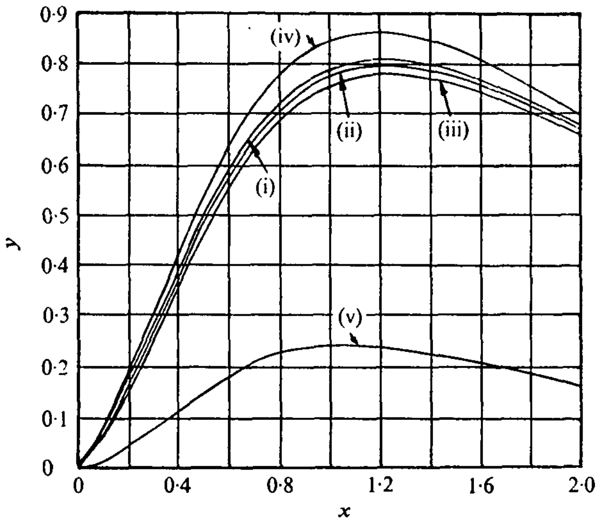

FIGURE 1. Plot of growth rate y against wave number x, taking $B = 5$, $\alpha = 0{\cdot}5$, $\theta = 0$.

	(i)	(ii)	(iii)	(iv)	(v)
A	1	1	1	5	1
S	1	1	1	1	5
N	0·1	0·2	0·3	0·1	0·1

https://doi.org/10.1017/S002237780000982X Published online by Cambridge University Press