

Abstract Submitted  
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**Transient growth in Rayleigh-Benard-Poiseuille and Rayleigh-Benard-Couette flows** JOHN SOUNDAR JEROME JOSEPH, JEAN-MARC CHOMAZ, PATRICK HUERRE — A study on the effect of buoyancy in plane Poiseuille flow and Couette flow has been carried out through linear temporal stability analysis, in the normal and non-normal framework. Here, the buoyancy is solely induced by a constant thermal stratification in the wall-normal direction. In the context of linear temporal stability analysis, a parametric study of the marginally stable modes with respect to Reynolds and Rayleigh numbers has been presented. It is found that the wall-normal temperature gradient has a negligible effect on the Tollmien-Schlichting instability. Nevertheless, the nonmodal analysis shows that the coupling between the body force and shear has a favorable effect on the transient growth of longitudinal disturbances in both plane Poiseuille flow and Couette flow. The transient growth characteristics have been illustrated by making use of different energy norms.

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