STABILITY ANALYSIS OF MIXED CONVECTIVE BOUNDARY LAYER SLIP FLOW OVER A VERTICAL PLATE

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Abstract - The main purpose of this study is to examine the occurrence of multiple solutions for the opposing flow case of mixed convective boundary layer slip flow over a vertical plate. The governing equations are first transformed to similarity equations by using similarity transformation. The resulting equations are then solved by applying shooting technique with Maple software. The dual solutions occur due to presence of buoyancy force in the opposing flows case. Effects of the velocity slip parameter, Prandtl number, buoyancy parameter and thermal slip parameters have been examined. Stability analysis is performed by applying the bvp4c solver in the MATLAB to check the stability of the solutions. It is found that only the first solution is stable whereas second solution is unstable.

Keywords - Dual Solutions, Opposing Flows, Mixed Convective, Stability Analysis, Slip