STAGNATION POINT FLOW OVER A STRETCHING PERMEABLE SHEET IN A MICROPOLAR FLUID

(Aliran Titik Genangan Terhadap Helaian Meregang yang Telap
dalam Bendalir Mikropolar)

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ABSTRACT

The steady two-dimensional stagnation point flow of an incompressible micropolar fluid over a stretching permeable sheet is considered. The stretching velocity and the ambient fluid velocity are assumed to vary linearly with the distance from the stagnation point. The governing partial differential equations are transformed into ordinary differential equations using similarity transformation, before being solved numerically by the Keller-box method. The features of the flow characteristics are analysed and discussed. Comparison of the results of this study with the existing results for some particular cases has been done and found to be in excellent agreement. It is also observed that suction increases the skin friction coefficient whereas injection decreases it.

Keywords: boundary layer; micropolar fluid; stagnation point flow; stretching surface; suction/injection

ABSTRAK

Aliran titik genangan mantap dua matra terhadap helaian meregang yang telap dalam bendalir mikropolar tak mampat dipertimbangkan. Halaju regangan dan halaju bendalir sekitaran diandaikan berubah secara linear dari titik genangan. Persamaan menakluk dalam bentuk persamaan pembezaan separa dijelmakan kepada persamaan pembezaan biasa menggunakan penjelmaan keserupaan, sebelum diselesaikan secara berangka menggunakan kaedah kotak-Keller. Telatah-telatah aliran dianalisis dan dibincangkan. Perbandingan dengan keputusan-keputusan terdahulu untuk beberapa kes tertentu bagi kajian ini dilakukan dan menunjukkan keputusan yang sangat baik. Juga dapat diperhatikan bahawa sedutan meningkatkan pekali geseran kulit, manakala semburan bertindak sebaliknya.

Kata kunci: lapisan sempadan; bendalir mikropolar; aliran titik genangan; regangan permukaan; sedutan/semburan

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