Journal of Quality Measurement and Analysis *JQMA 6(1) 2010, 85-93*
Jurnal Pengukuran Kualiti dan Analisis

FLOW OVER A STRETCHING SHEET IN A MICROPOLAR FLUID WITH RADIATION EFFECT

(Aliran pada Helaian Meregang dalam Bendalir Mikrokutub dengan Kesan Sinaran)

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ABSTRACT

Boundary layer flow and heat transfer characteristics induced by a linearly stretching sheet immersed in an incompressible micropolar fluid with prescribed surface heat flux in the presence of radiation effect is investigated. The governing system of partial differential equations is first transformed into a system of ordinary differential equations using similarity transformation, which are then solved numerically using the Runge-Kutta-Fehlberg method. The velocity, angular velocity and temperature profiles with the effects of various physical parameters are presented graphically. It is found that the heat transfer rate at the surface decreases in the presence of radiation.

Keywords: boundary layer; heat transfer; micropolar fluid; radiation; stretching sheet

ABSTRAK

Ciri-ciri aliran lapisan sempadan dan pemindahan haba yang dirangsang oleh helaian meregang secara linear dalam bendalir mikrokutub tak mampat dengan fluks haba permukaan ditetapkan dan dengan kehadiran kesan sinaran diselidik. Sistem persamaan menakluk dalam bentuk persamaan pembezaan separa dijelmakan kepada sistem persamaan pembezaan biasa menggunakan penjelmaan keserupaan, yang seterusnya diselesaikan secara berangka menggunakan kaedah Runge-Kutta-Fehlberg. Profil-profil halaju, halaju sudut dan suhu dengan pelbagai kesan parameter fizikal dipersembahkan dalam bentuk graf. Didapati kadar pemindahan haba pada permukaan menyusut dengan kehadiran sinaran.

Kata kunci: lapisan sempadan; pemindahan haba; bendalir mikrokutub; sinaran; helaian meregang

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