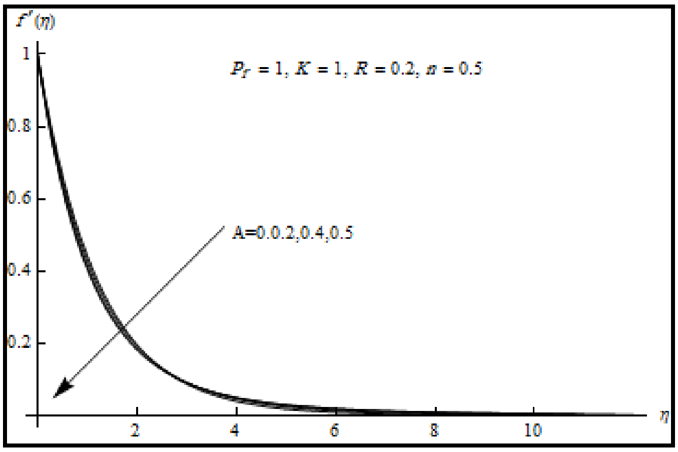

Figure 1 Velocity profiles $f'(\eta)$ for some values of A

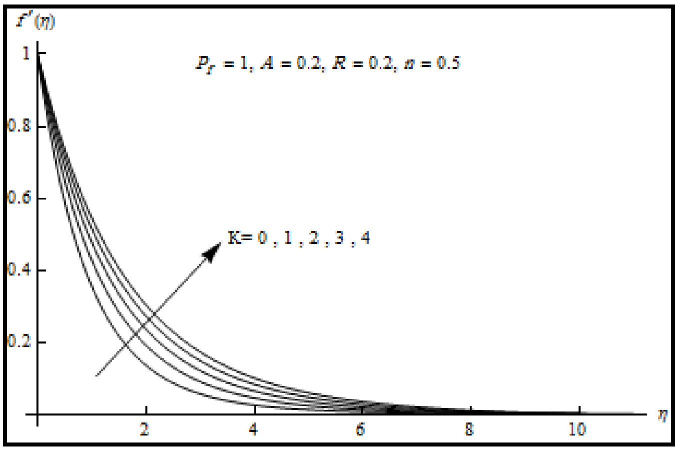

Figure 2 Velocity profiles $f'(\eta)$ for some values of K

Figure 1 and Figure 2 show the effects of the unsteadiness parameter A and material parameter K on the fluid velocity respectively. The effect of increasing A is to decrease the velocity of the fluid. The fluid velocity is incraesed due to increasing the value of the parameter K.

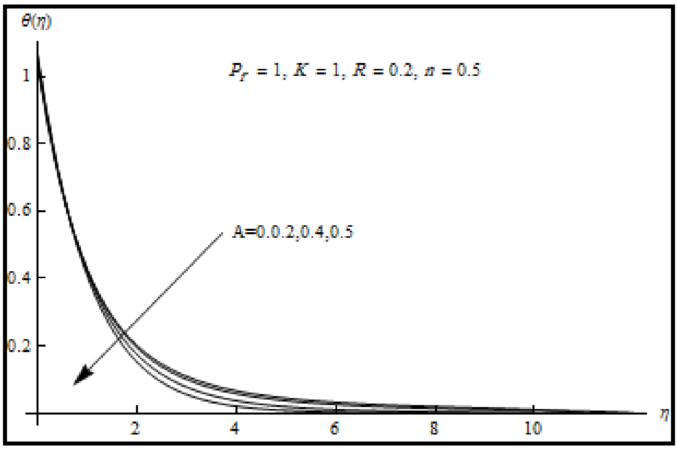

Figure 3 Temperature profiles $\theta(\eta)$ for some values of A

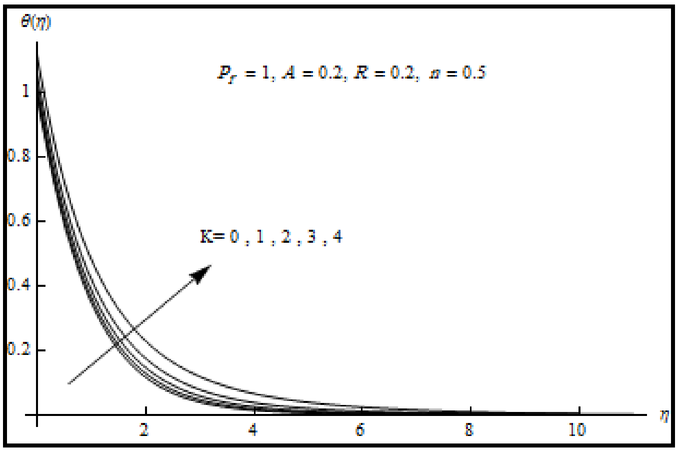

Figure 4 Temperature profiles $\theta(\eta)$ for some values of K

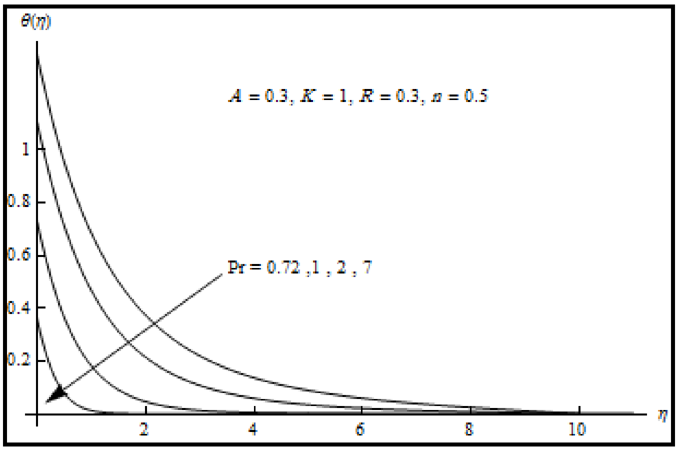

Figure 5 Temperature profiles $\theta(\eta)$ for some values of Pr

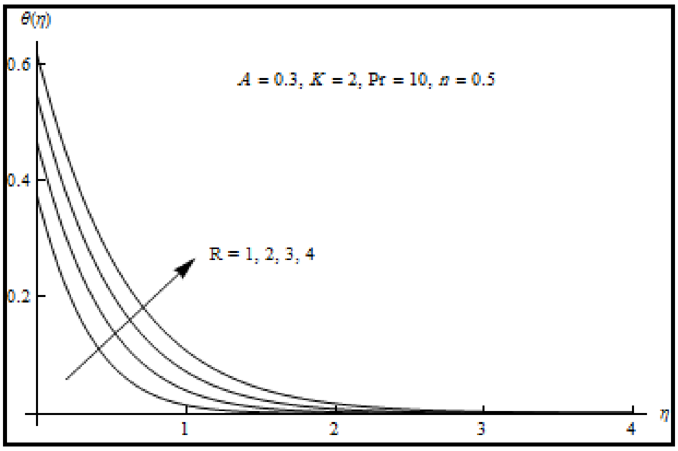

Figure 6 Temperature profiles $\theta(\eta)$ for some values of R

Figures (3)-(6) show the temperature profile for different values of the unsteadiness parameter (A), material parameter (K), Prandtl number (Pr) and thermal radiation parameter (R). Representative temperature profile is presented in Figure 3, for n=0.5, R=0.2, K=Pr=1 and different values of the unsteadiness parameter (A).The results show that the temperature decreases with the distance from the stretching surface. In addition, increasing the value of the unsteadiness parameter (A) tends to decrease the temperature within the boundary layer. Figure 4 shows that the effect of the material parameter (K) on the temperature.The temperature within the boundary layer increases with the increase of the material parameter (K), while in Figure 5, the temperature decreases with the increase of the Prandlt number (Pr), as the Prandtl number increases, viscous forces tend to suppress the buoyancy forces and cause the temperature in the thermal boundary layer to decrease.

It is also observed that (Figure 6) increasing the value of R have the tendency to increase the conduction effects and to increase the thermal boundary layer, so the fluid temperature is to increase

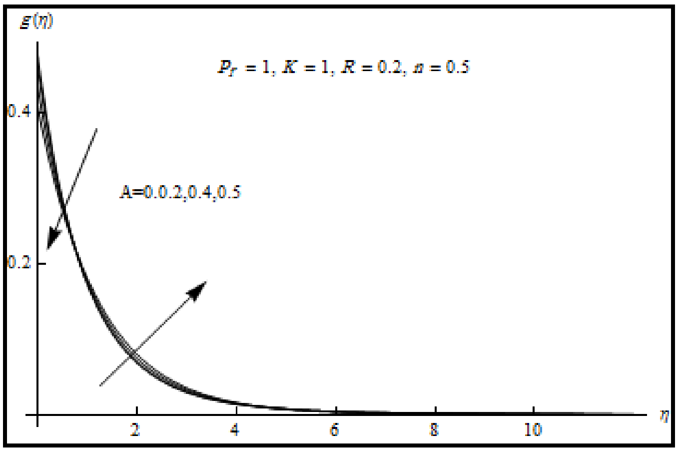

Figure 7 Angular velocity profiles $g(\eta)$ for some values of A

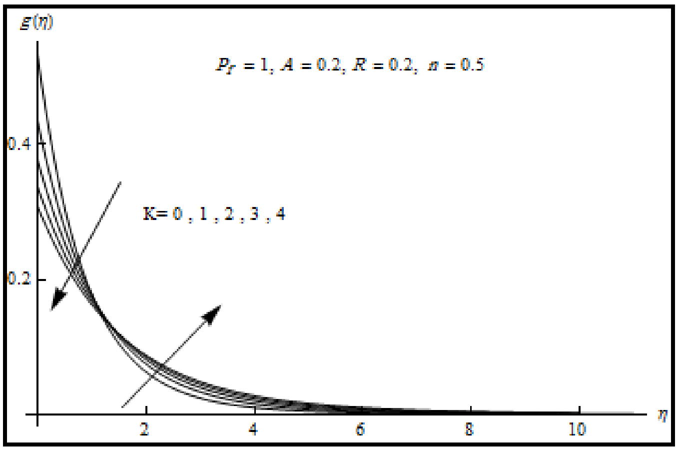

Figure 8 Angular velocity profiles $g(\eta)$ for some values of K

Figures (7) and (8) display the effects of the unsteadiness parameter (A) and the material parameter (K) on the micro rotation (angular velocity) profile. It is clear that as the unsteadiness parameter (A) and the material parameter (K) increase the angular velocity profile decreases in the region near of the surface and after a short distance from the surface these profiles overlap and then increase with increase of the unsteadiness parameter (A) and the material parameter (K).

In Tables (2)-(4) we have presented the local Nusselt number for various values of n, A, Pr, R, and K. These Tables show that the local Nusselt number is increased for all values of R, Pr, A, and K. This can be explained from the fact that as the Prandtl number increases the thermal boundary layer thickness decreases and the wall temperature gradient increases.

6.CONCLUSION

In this paper, we have studied the problem of the boundary layer flow of a micropolar fluid and heat transfer on an unsteady stretching surface in the presence of thermal radiation effect. The governing boundary layer equations were solved numerically .A discussion of the effects of the governing parameters; the unsteadiness parameter (A),material parameter (K), the Prandtl number (Pr) and the thermal radiation parameter (R) on the heat transfer characteristics in the cases n = 0, 0.5, Pr= 0.72, 1, 10, R=1, 2, 3, 4, K= 0, 1, 2, 3, 4 and A = 0, 0.2, 0.4, 0.5 has been done.We found that the heat transfer rate at the surface $(1+R)/\theta(0)$ increases with the increase of R, Pr, A, and K.

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