

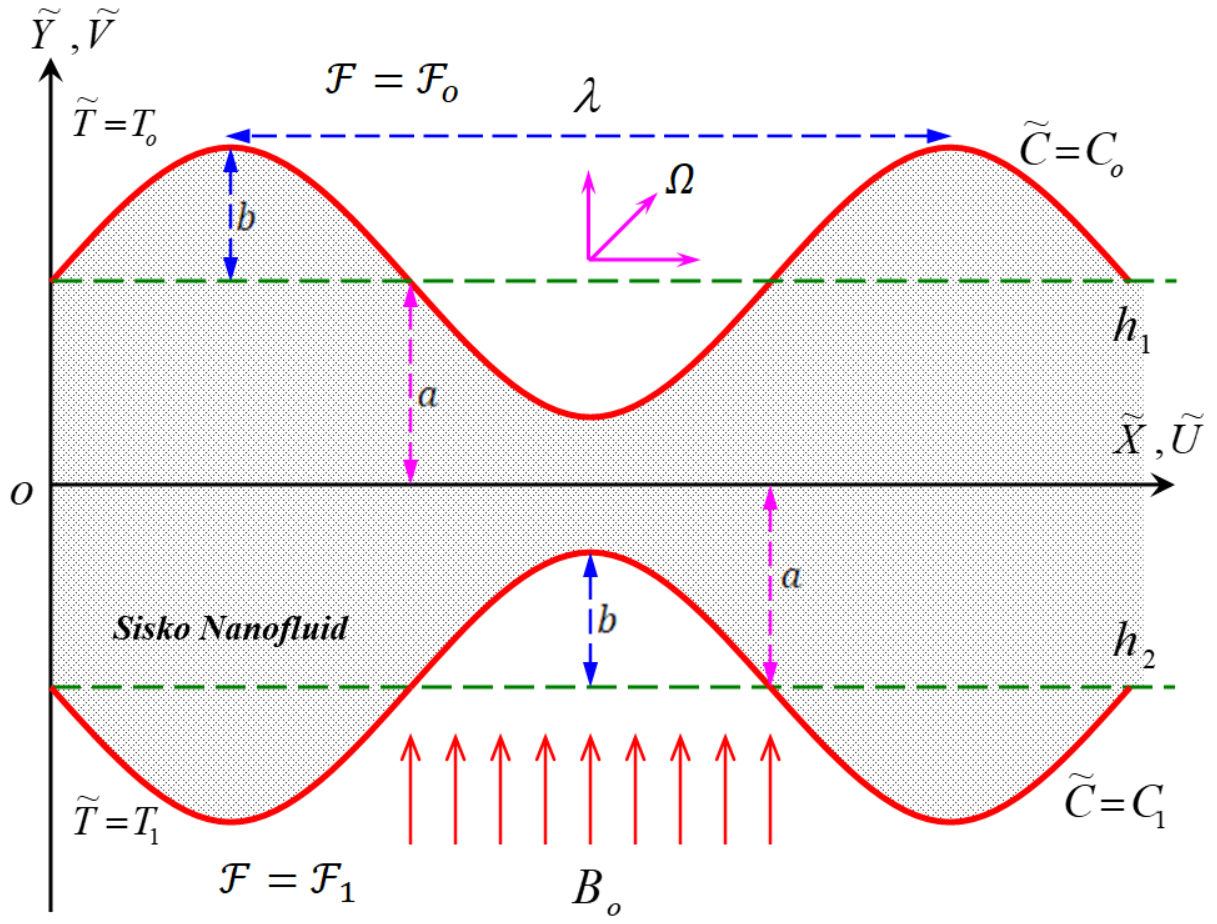


Figure 1. the geometry of the problem.

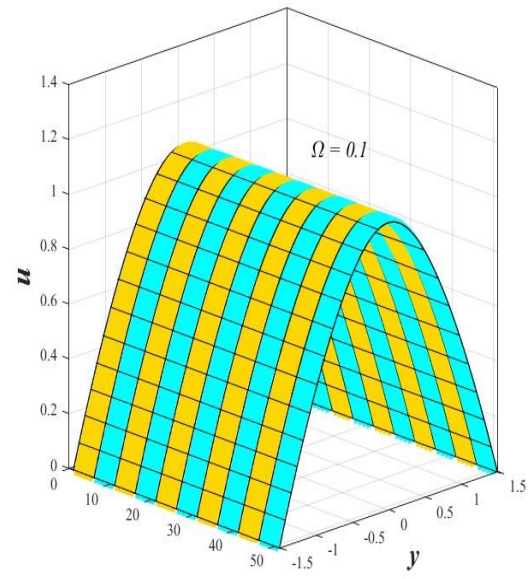
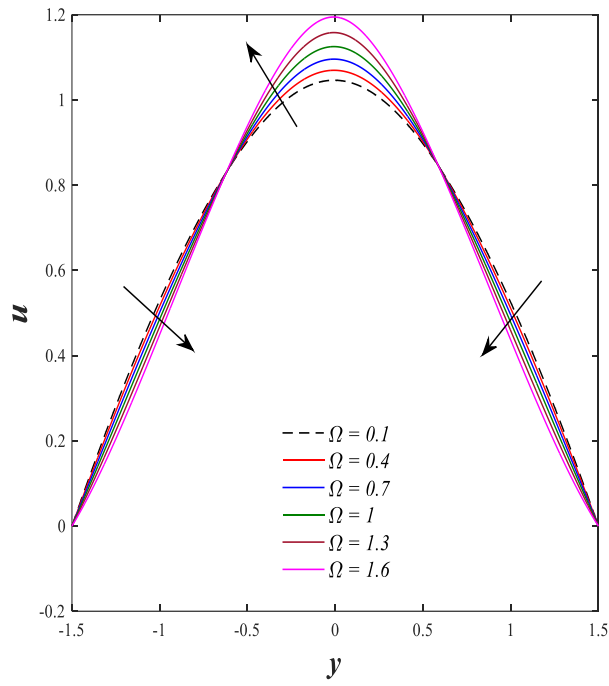


Figure 2. Effect of Rotation on the axial velocity distribution.

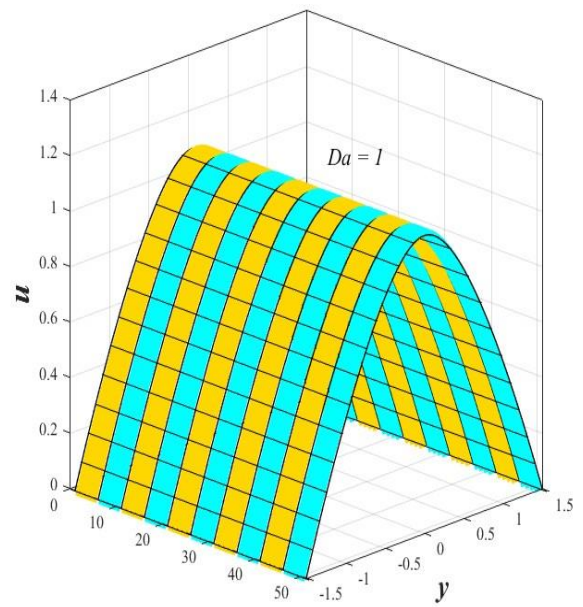
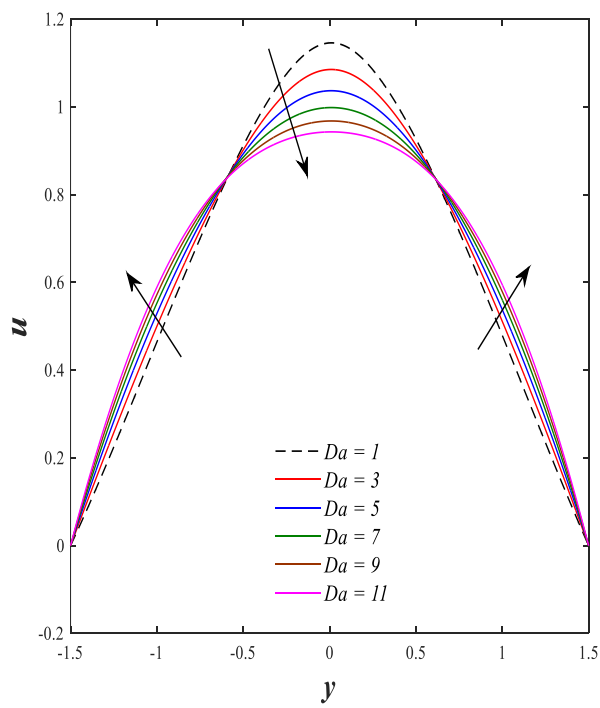


Figure 3. Effect of Darcy number on the axial velocity distribution.

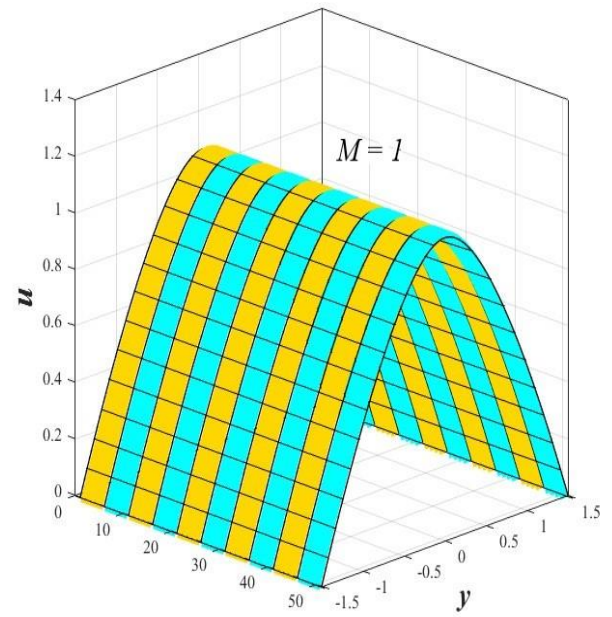
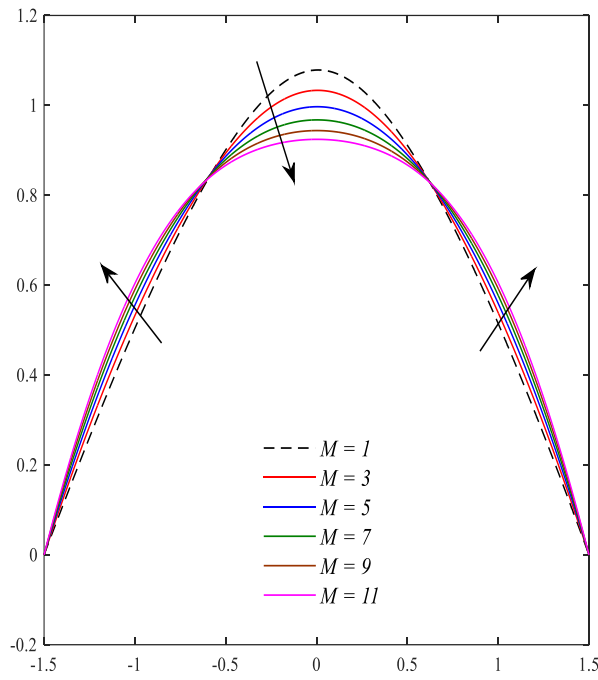


Figure 4. Effect of Darcy number on the axial velocity distribution.

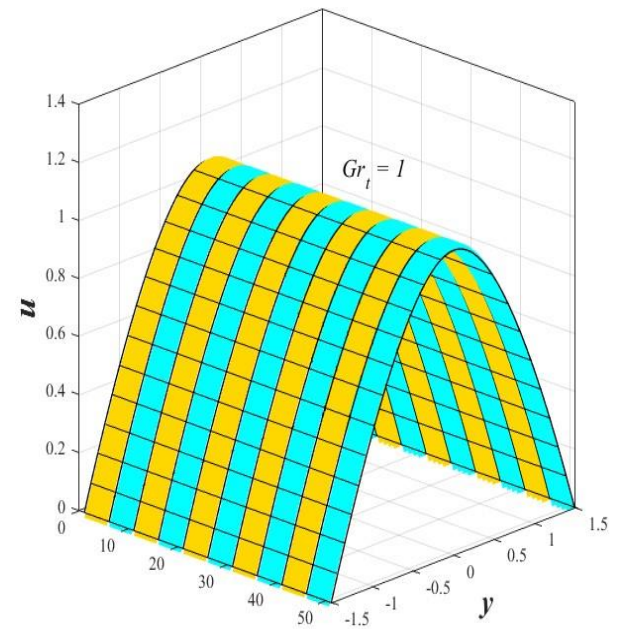
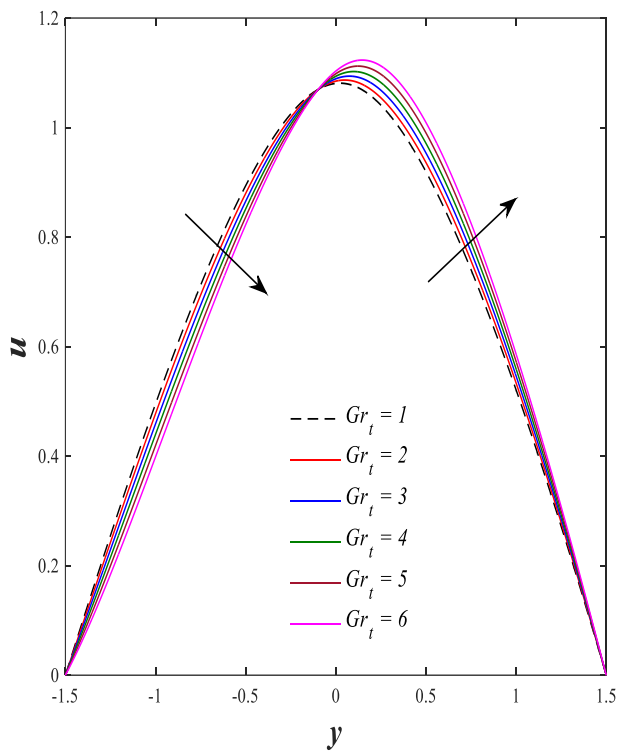


Figure 5. Effect of heat Grashof number Gr_T on the axial velocity distribution.

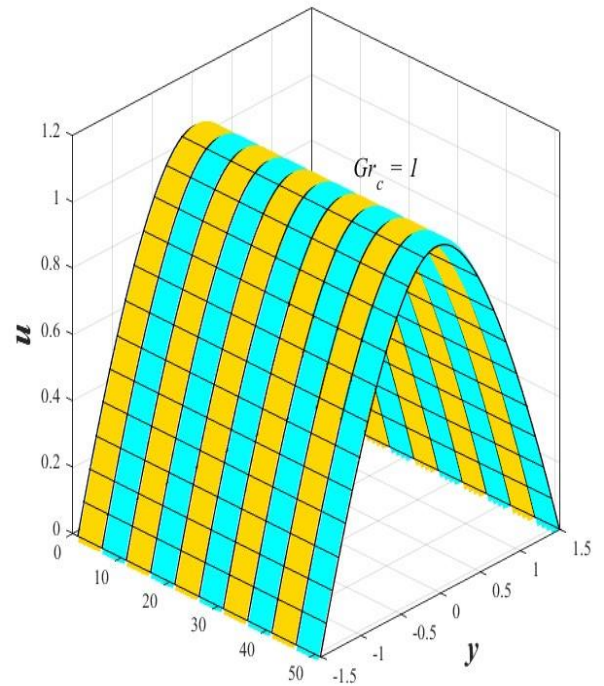
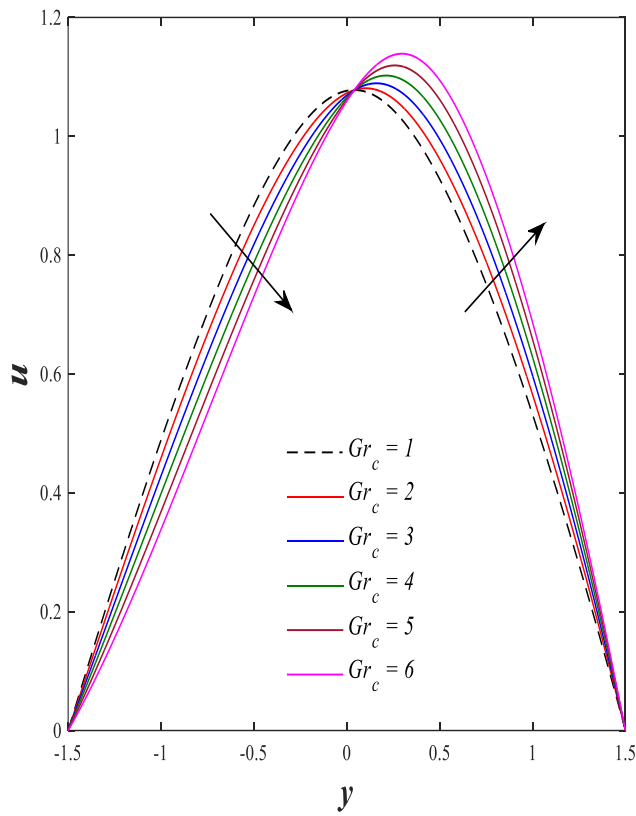


Figure 6. Effect of solutal Grashof number Gr_c on the axial velocity distribution.

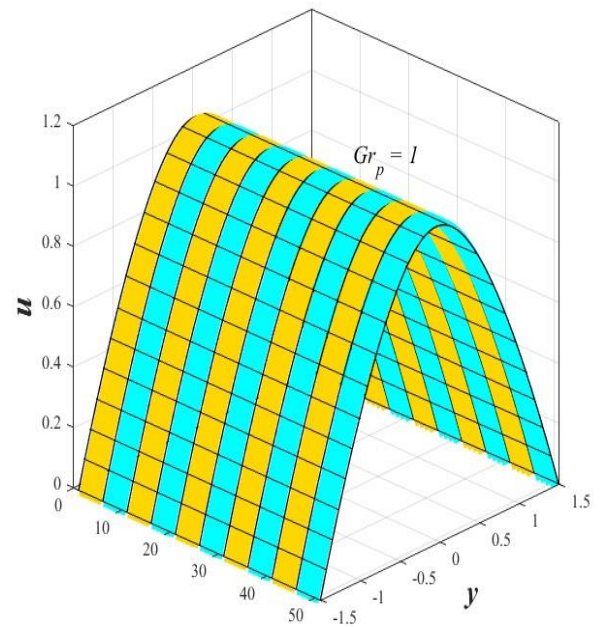
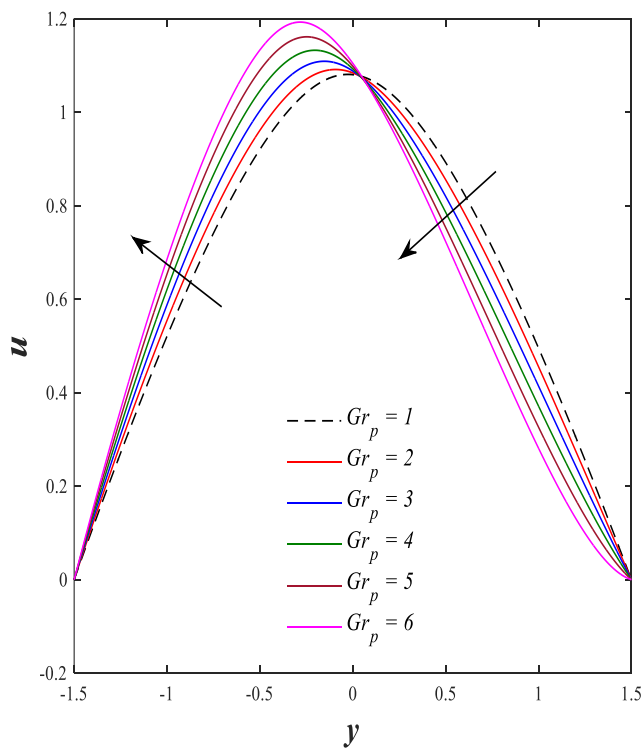


Figure 7. Effect of solutal Grashof number Gr_p on the axial velocity distribution.

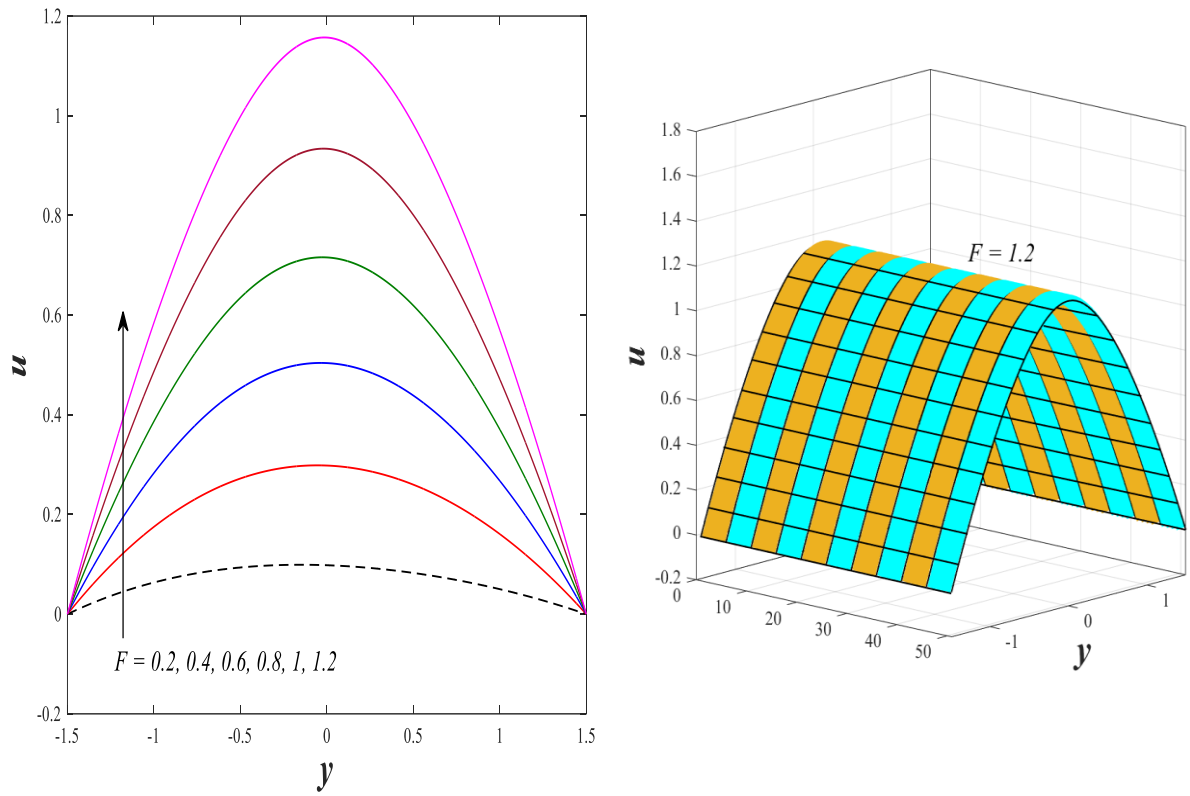


Figure 8. Effect of mean flow F on the axial velocity distribution.

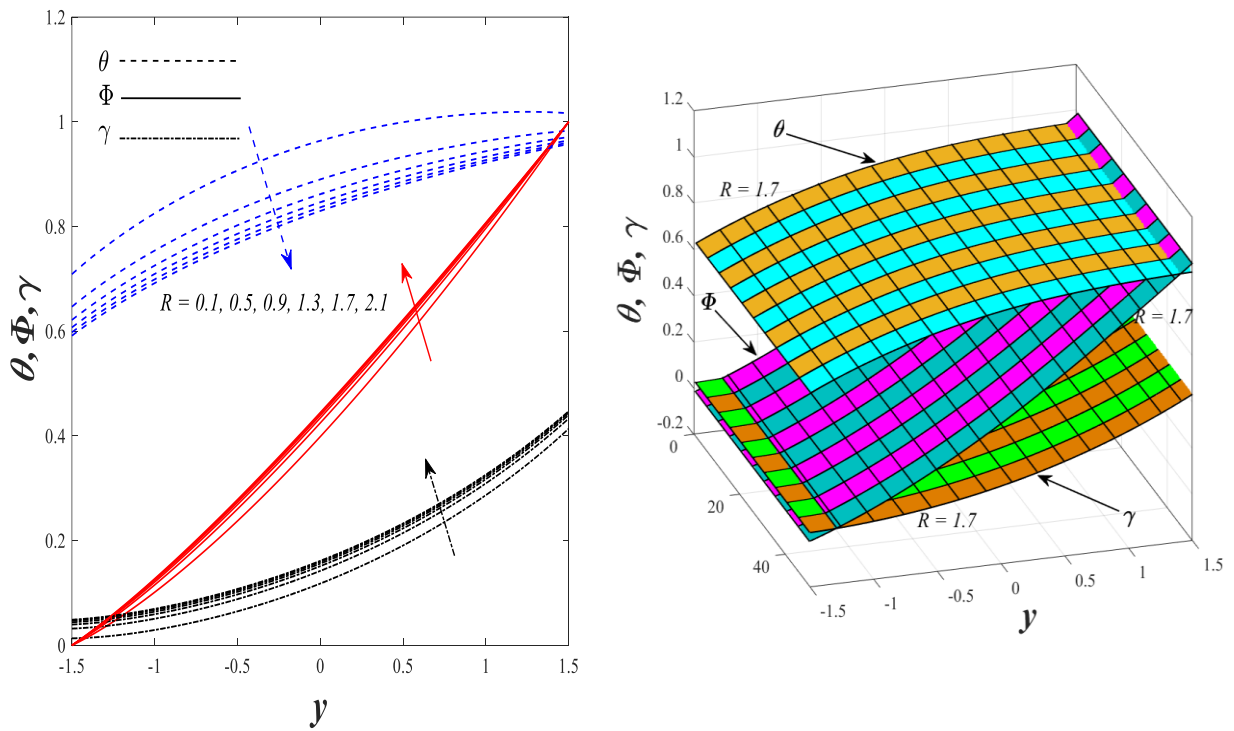


Figure 9. Effect of non-linear thermal radiation parameter R on the distributions of both temperature, solutal concentration and nanoparticles volume fraction.

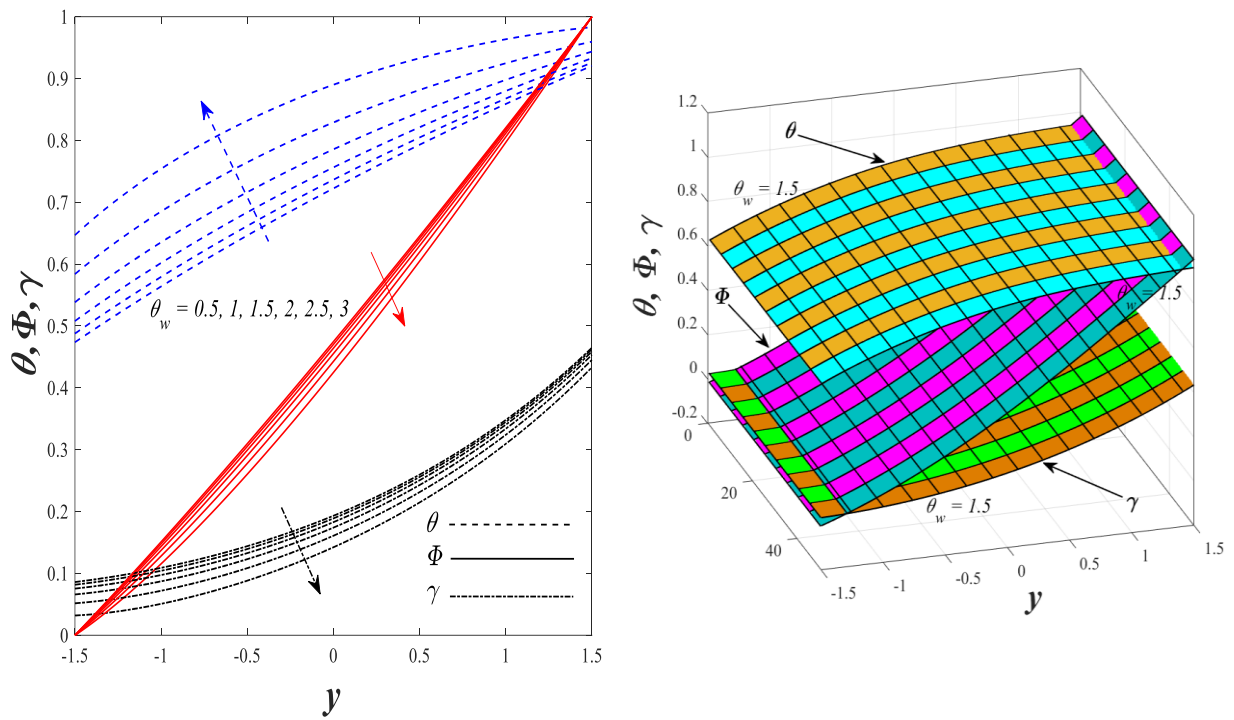


Figure 10. Effect of temperature ratio parameter θ_w on the distributions of both temperature, solutal concentration and nanoparticles volume fraction.

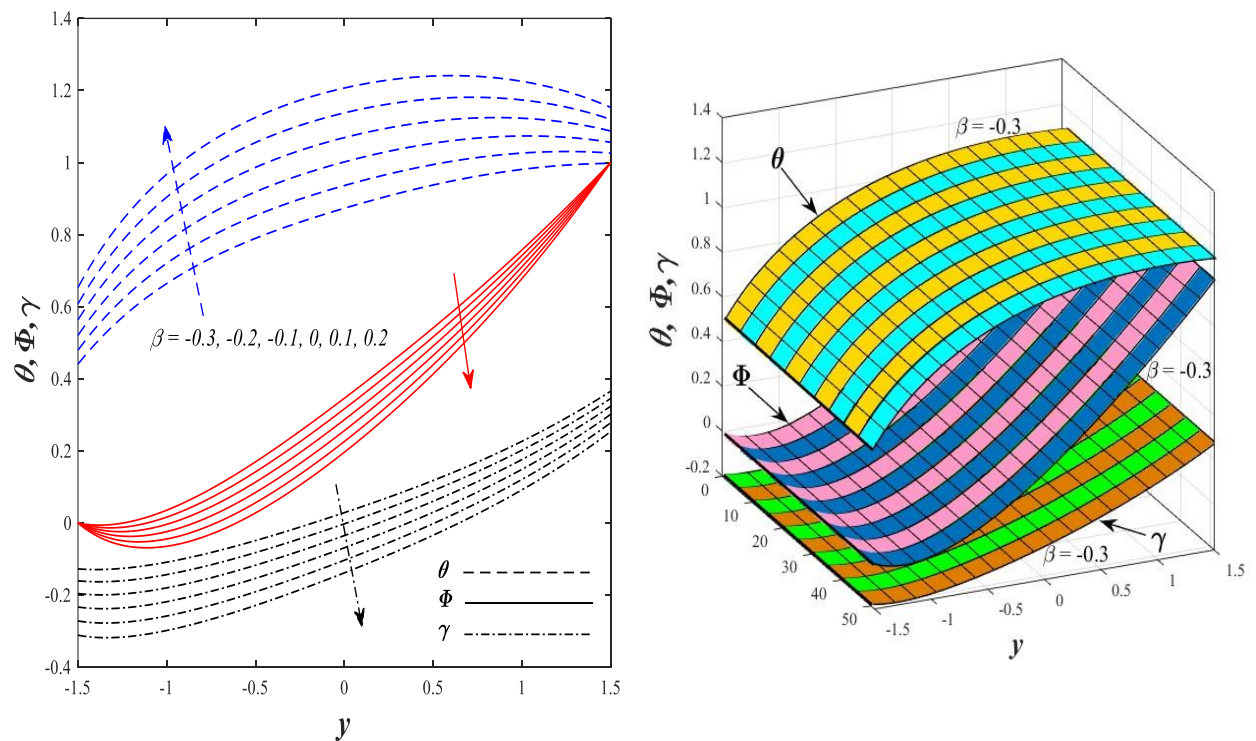


Figure 11. Effect of heat generation/absorption parameter β on the distributions of both temperature, solutal concentration and nanoparticles volume fraction.

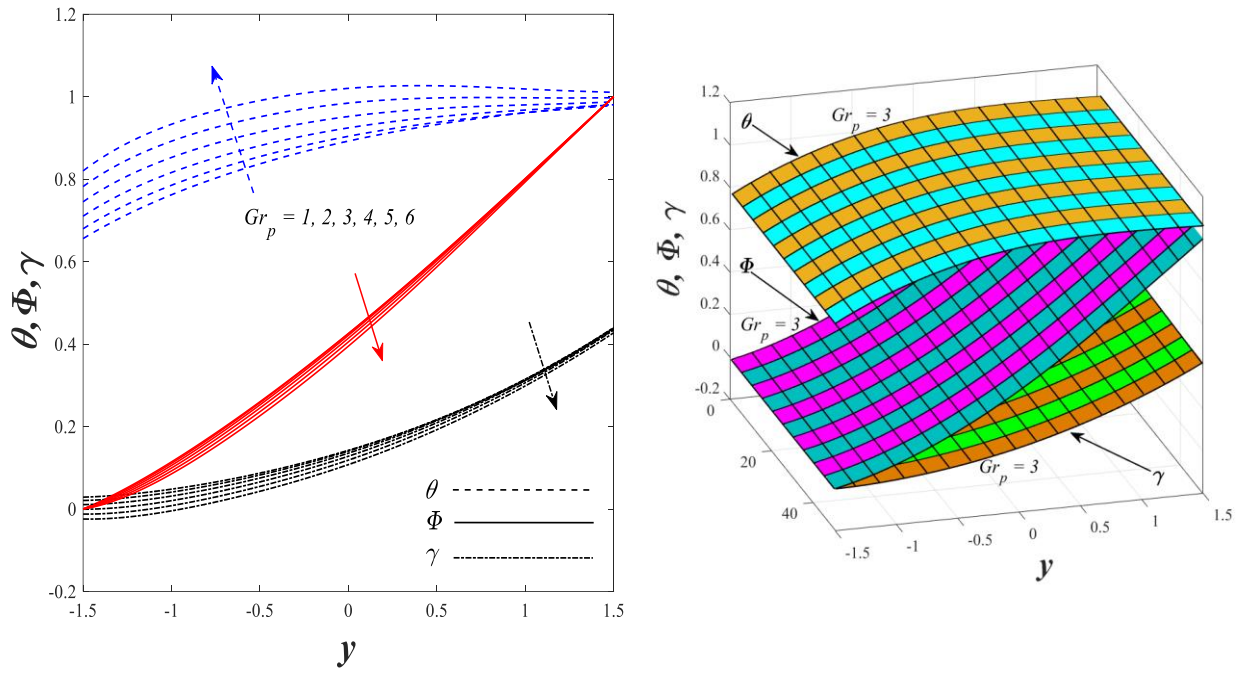


Figure 12. Effect of nanoparticles Grashof number Gr_p on the distributions of both temperature, solutal concentration and nanoparticles volume fraction.

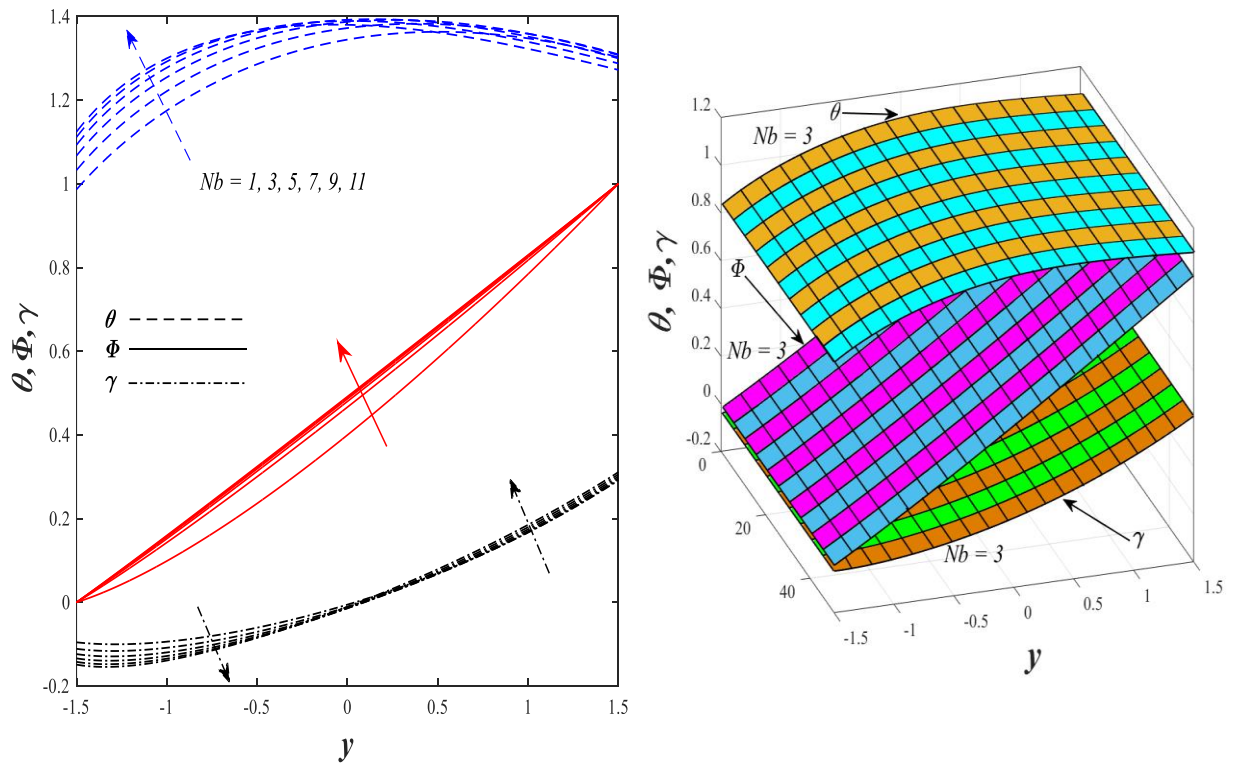


Figure 13. Effect of Brownian motion parameter Nb on the distributions of both temperature, solutal concentration and nanoparticles volume fraction.

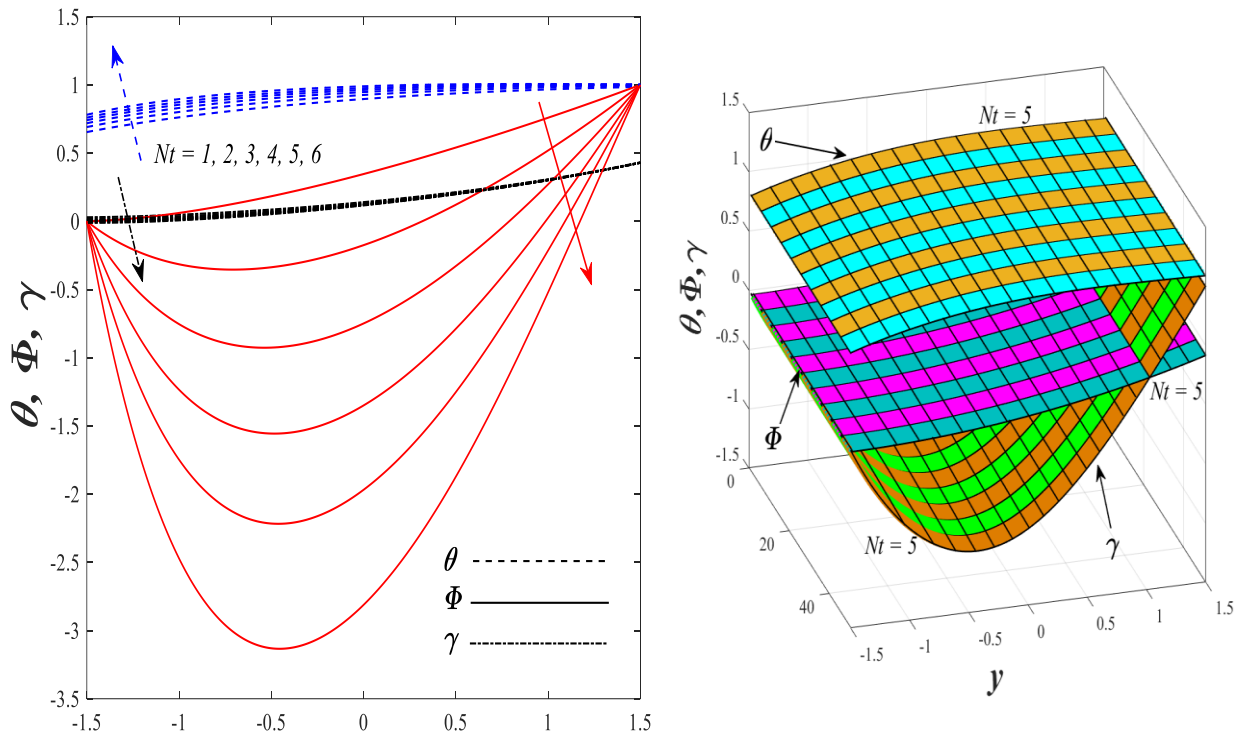


Figure 14. Effect of Brownian motion parameter Nt on the distributions of both temperature, solutal concentration and nanoparticles volume fraction.

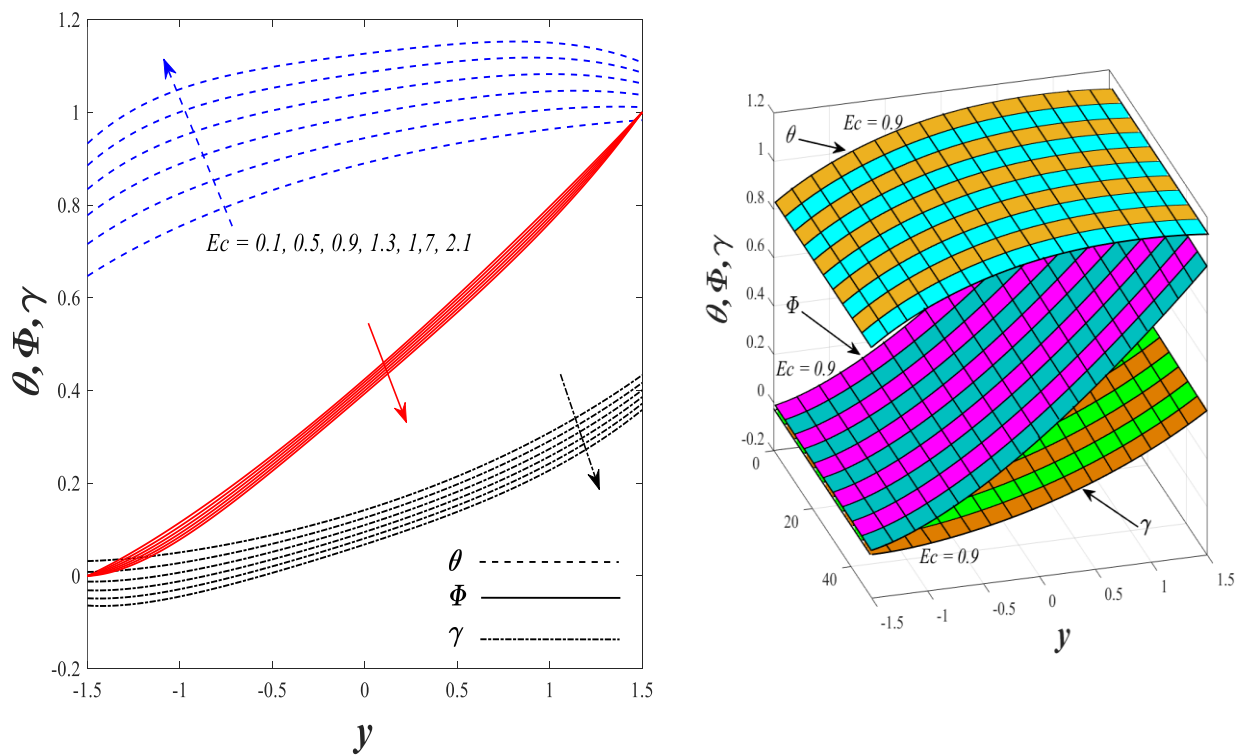


Figure 15. Effect of Eckert number Ec on the distributions of both temperature, solutal concentration and nanoparticles volume fraction.

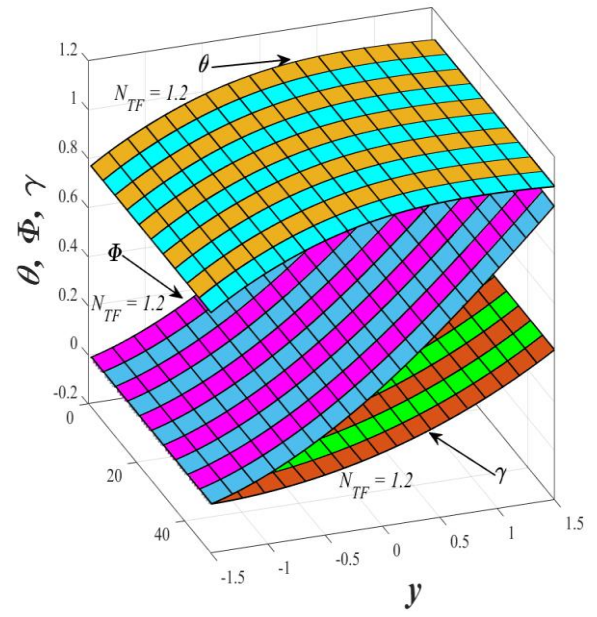
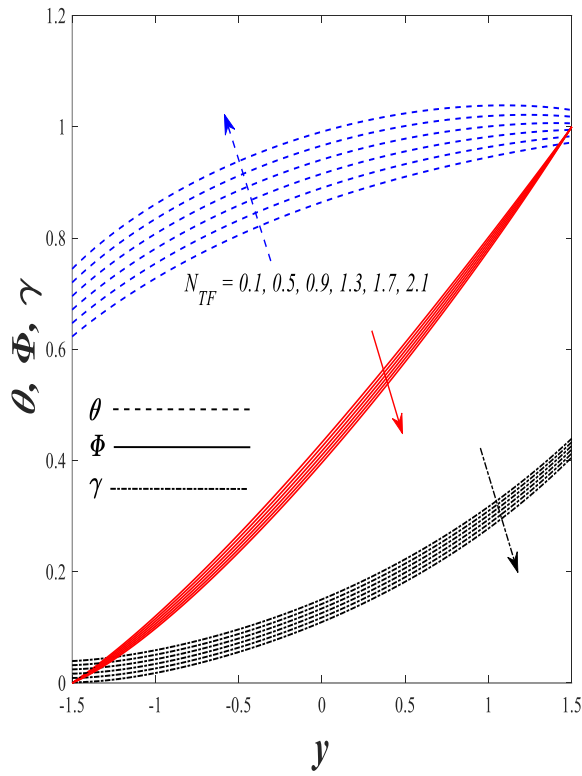


Figure 16. Effect of Dufour parameter N_{TF} on the distributions of both temperature, solutal concentration and nanoparticles volume fraction.

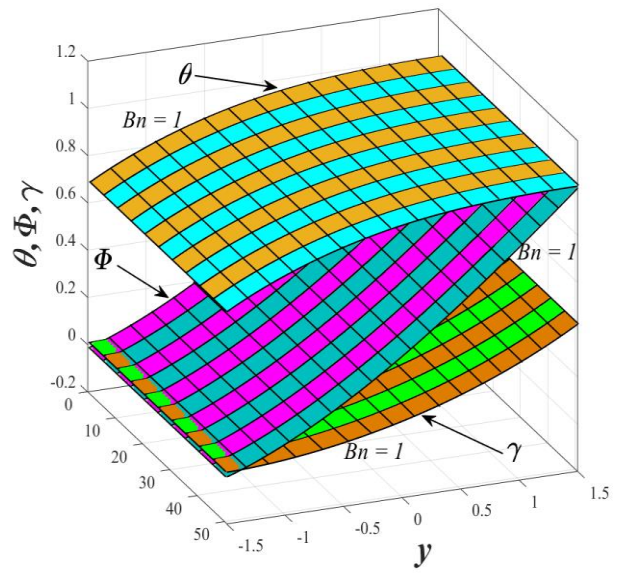
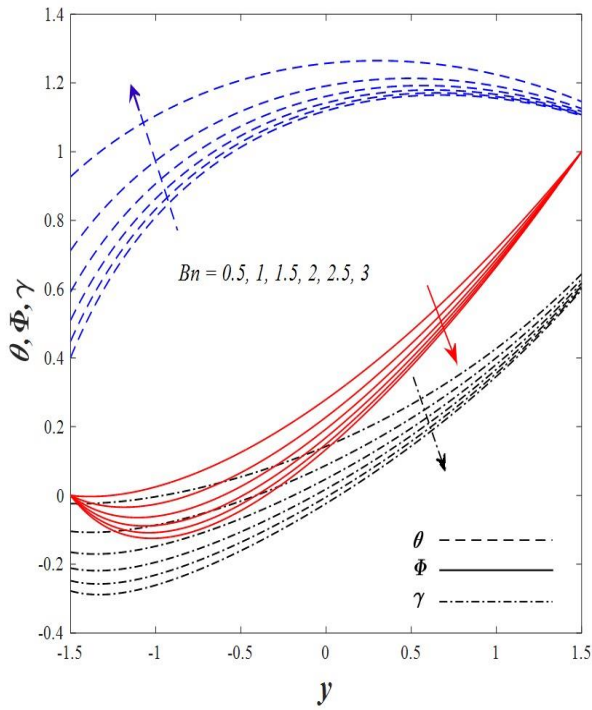


Figure 17. Effect of Dufour parameter N_{TF} on the distributions of both temperature, solutal concentration and nanoparticles volume fraction.

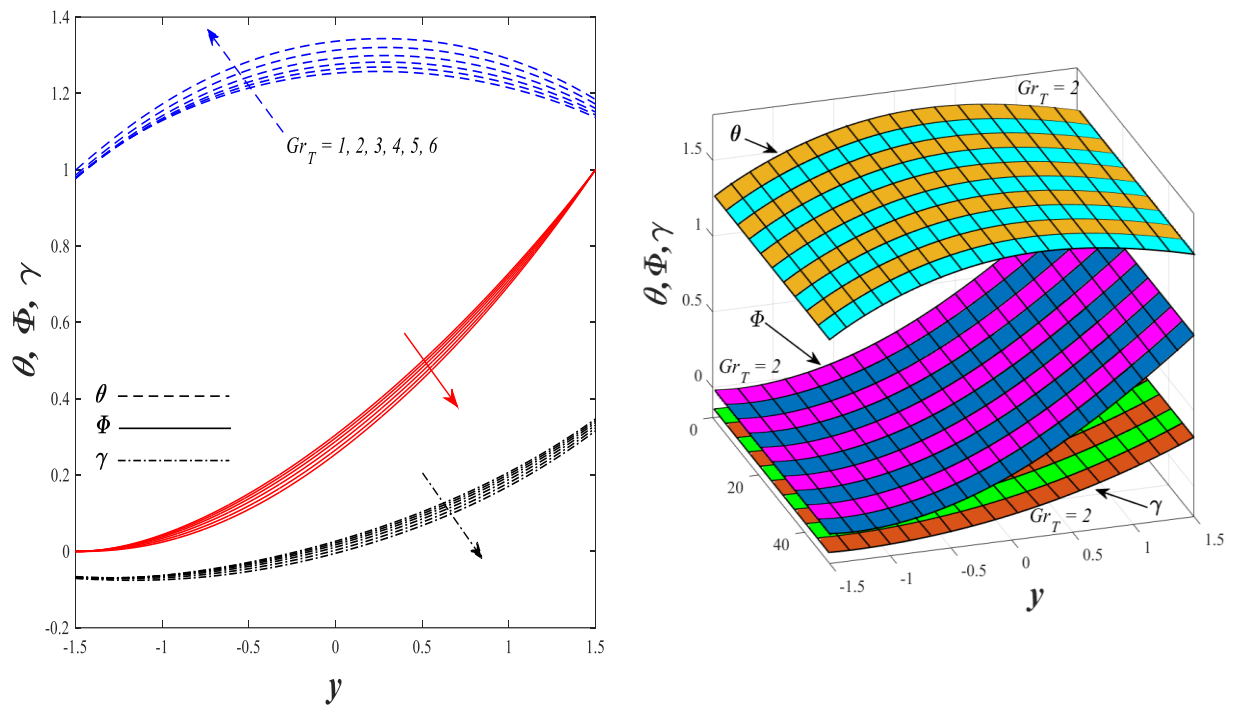


Figure 18. Effect of heat Grashof number Gr_T on the distributions of both temperature, solutal concentration and nanoparticles volume fraction.

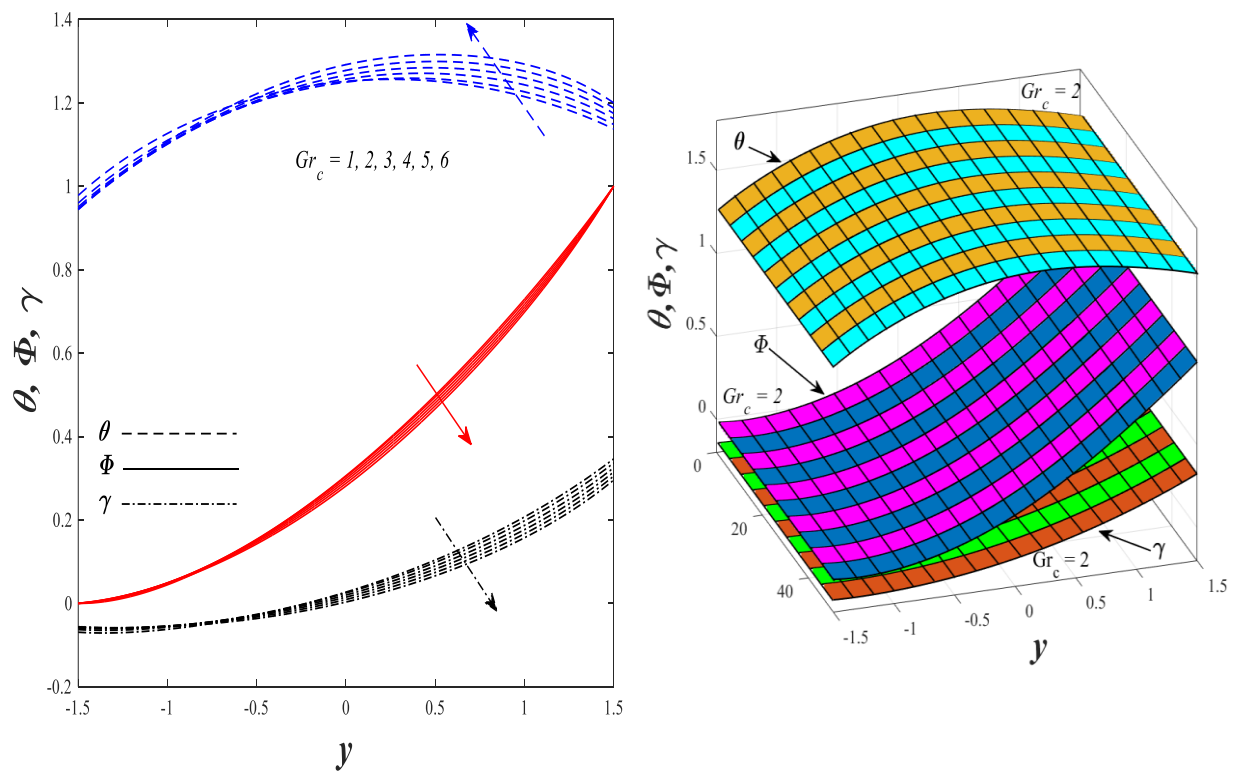


Figure 19. Effect of solutal Grashof number Gr_c on the distributions of both temperature, solutal concentration and nanoparticles volume fraction.

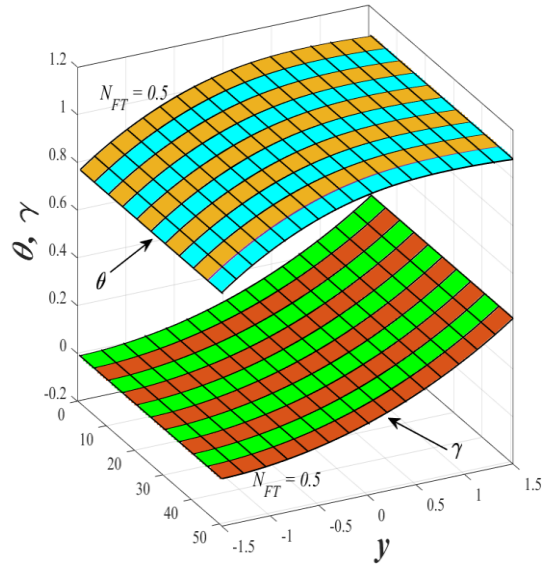
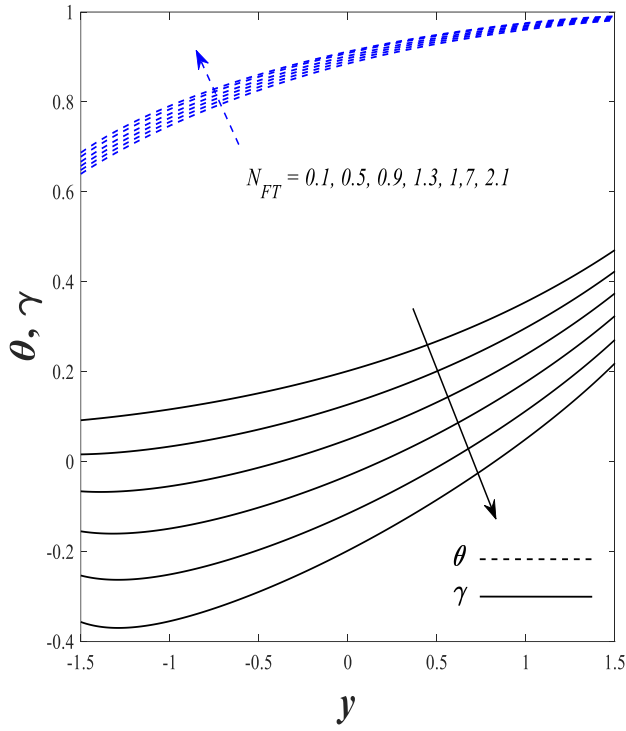


Figure 20. Effect of Soret parameter N_{FT} on the distributions of both temperature and solutal concentration.

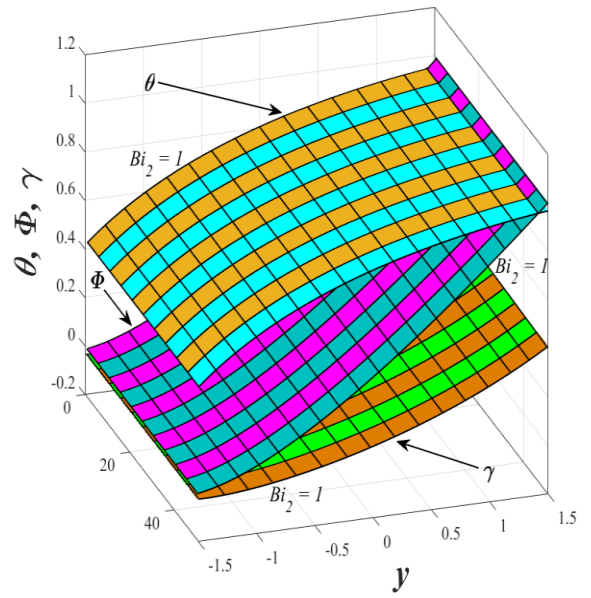
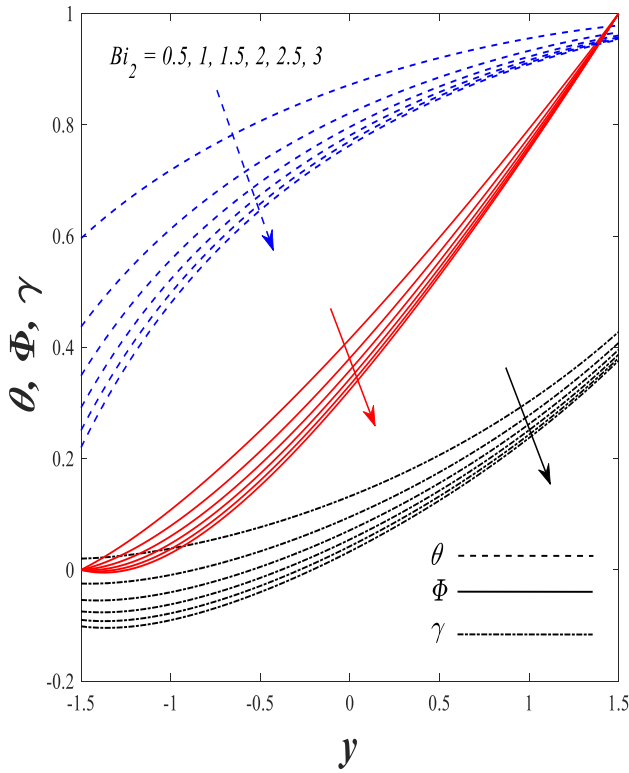


Figure 21. Effect of heat Biot number Bi_2 on the distributions of both temperature and solutal concentration.

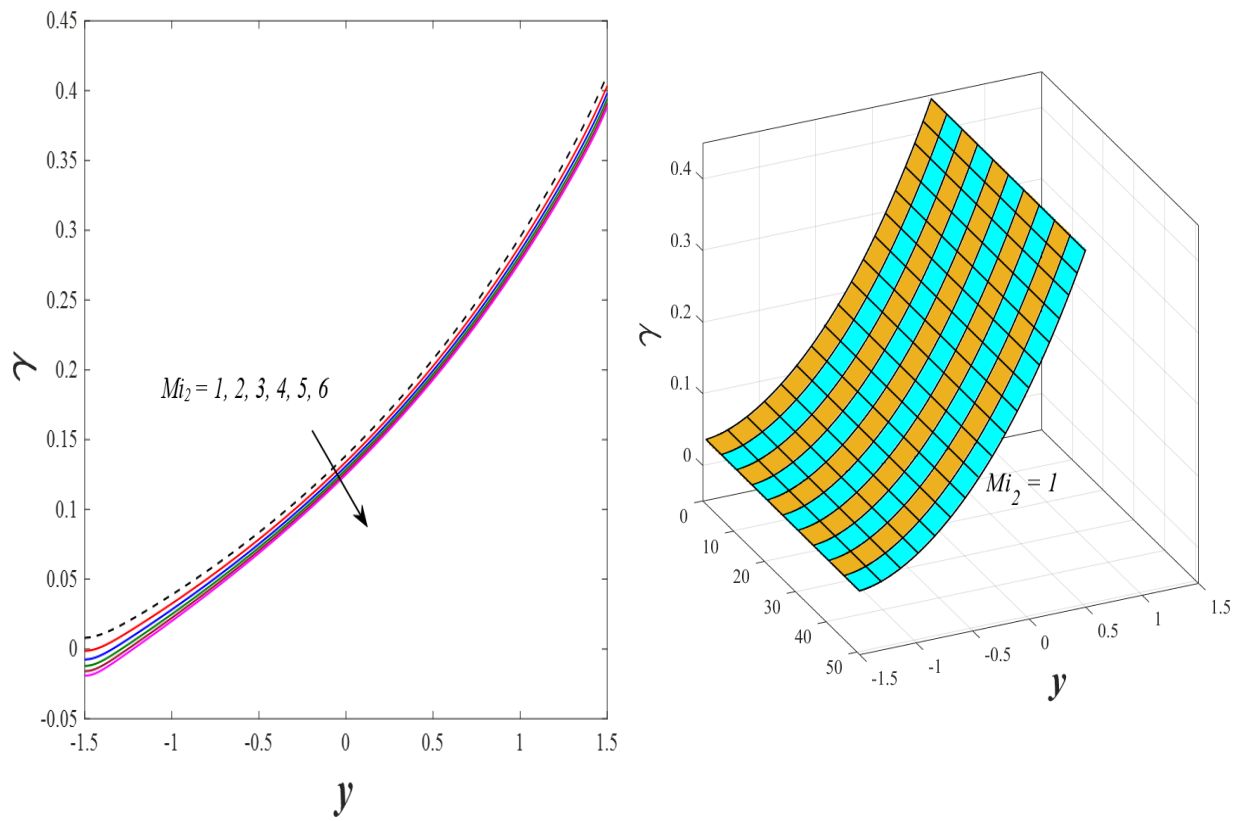


Figure 22. Effect of mass Biot number Mi_2 on the distributions of both temperature and solutal concentration.

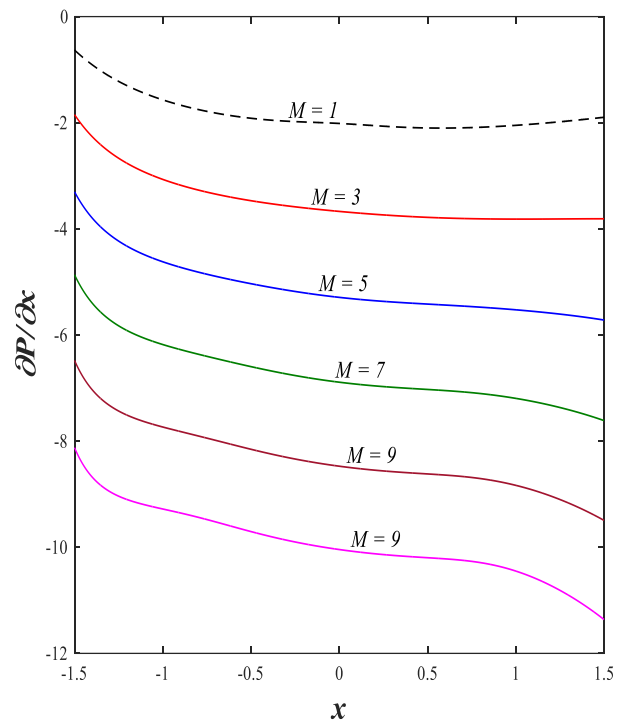


Figure 23. Effect of magnetic field parameter M on the pressure gradients distribution.

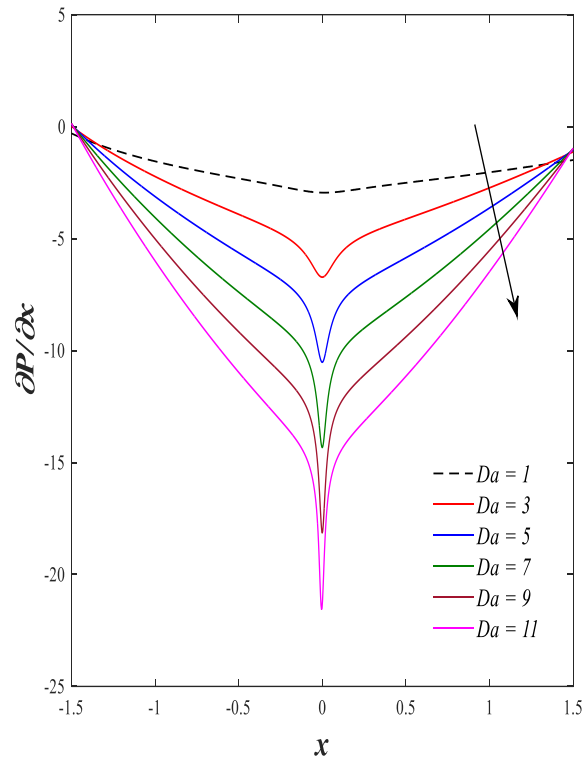


Figure 24. Effect of Darcy number Da on the pressure gradients distribution.

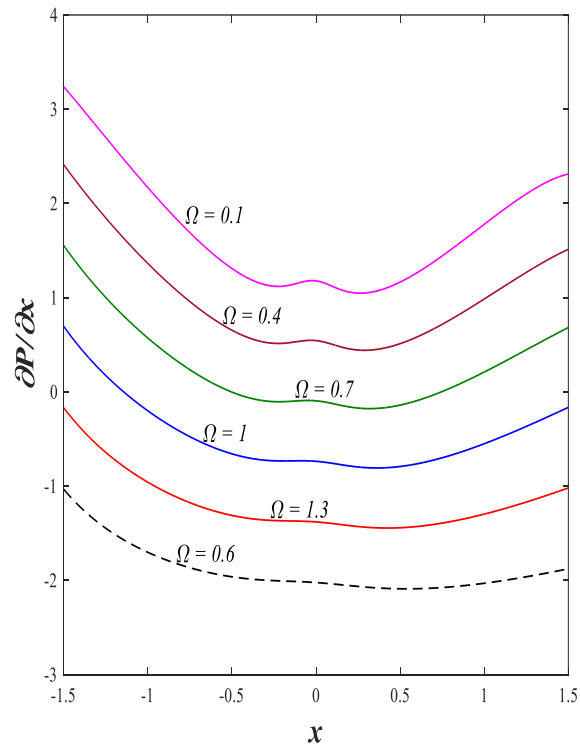


Figure 25. Effect of rotation Ω on the pressure gradients distribution.

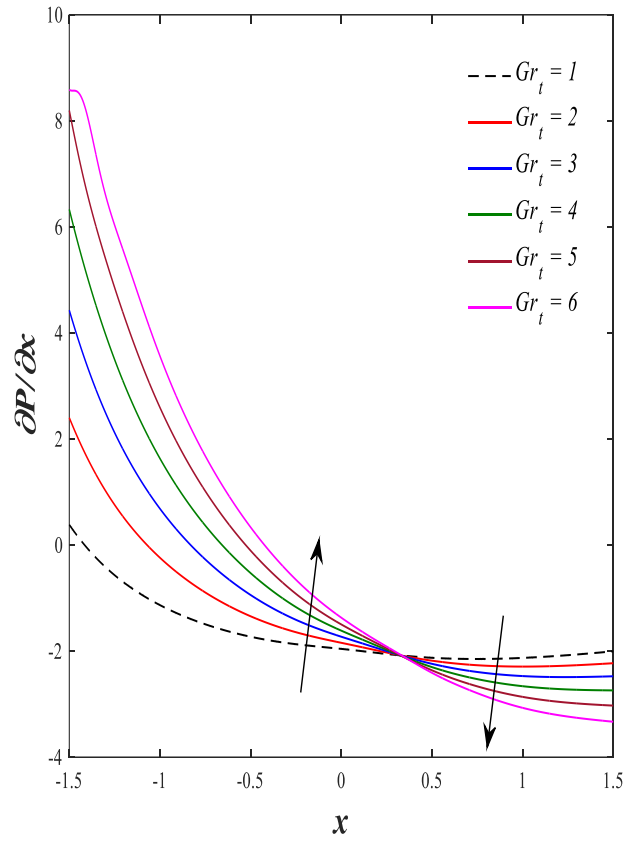


Figure 26. Effect of heat Grashof number Gr_T on the pressure gradients distribution.

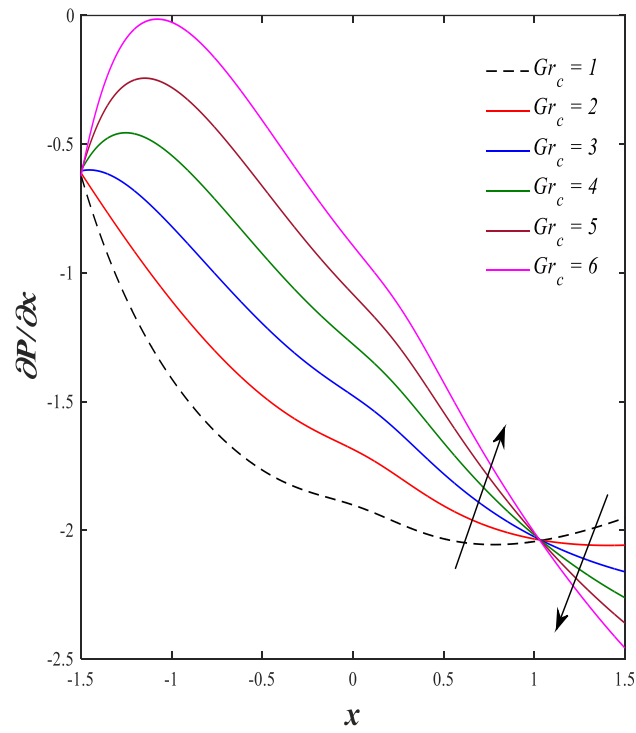


Figure 27. Effect of heat Grashof number Gr_T on the pressure gradients distribution.

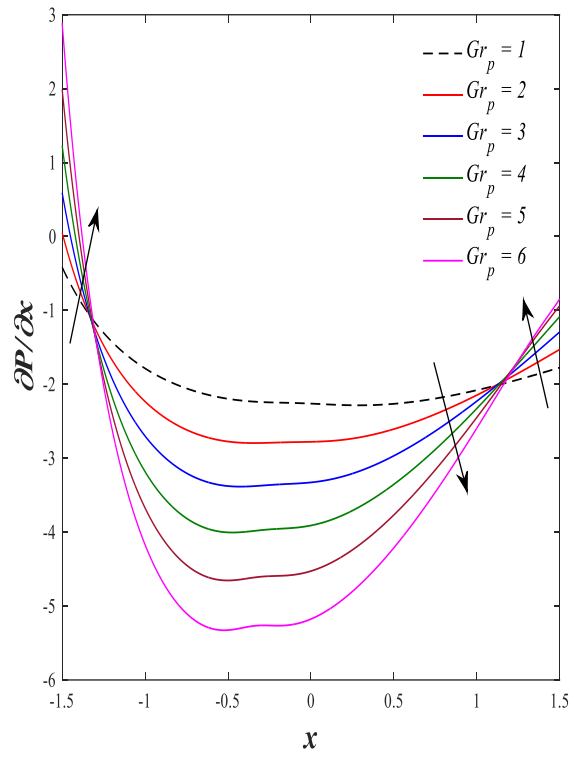


Figure 28. Effect of nanoparticles Grashof number Gr_p on the pressure gradients distribution.

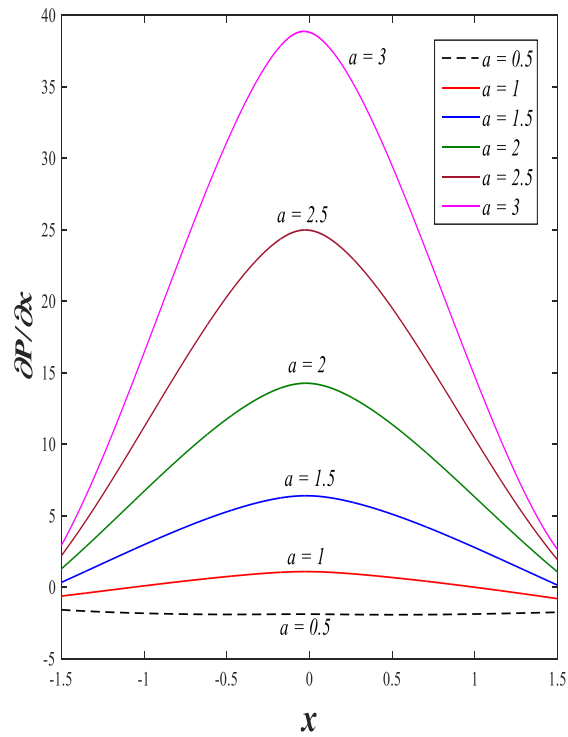


Figure 29. Effect of the half-channel width parameter a on the pressure gradients distribution.

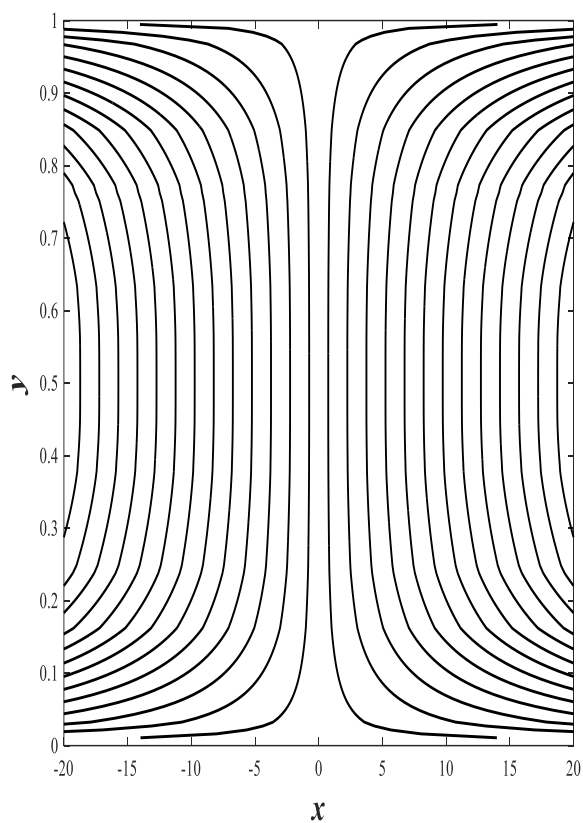


Figure 30. Stream lines profile at $F = 0.4$.

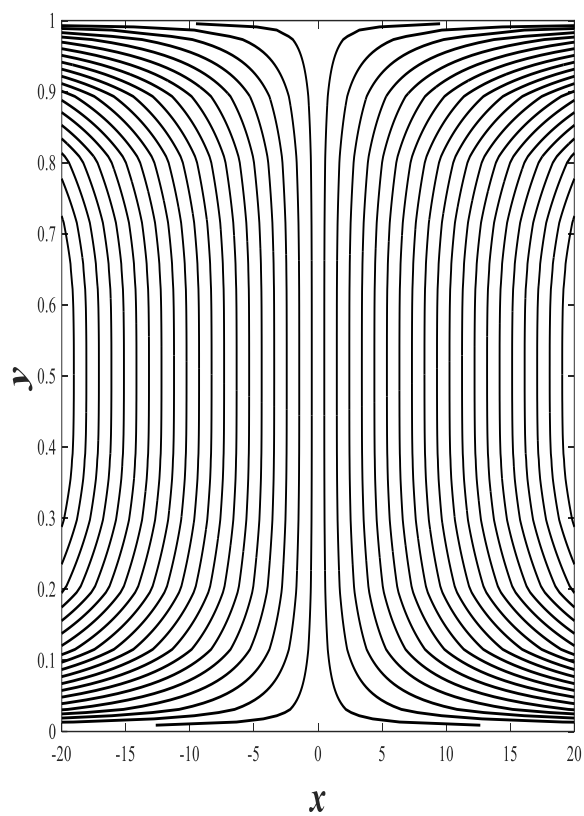


Figure 31. Stream lines profile at $F = 0.6$.

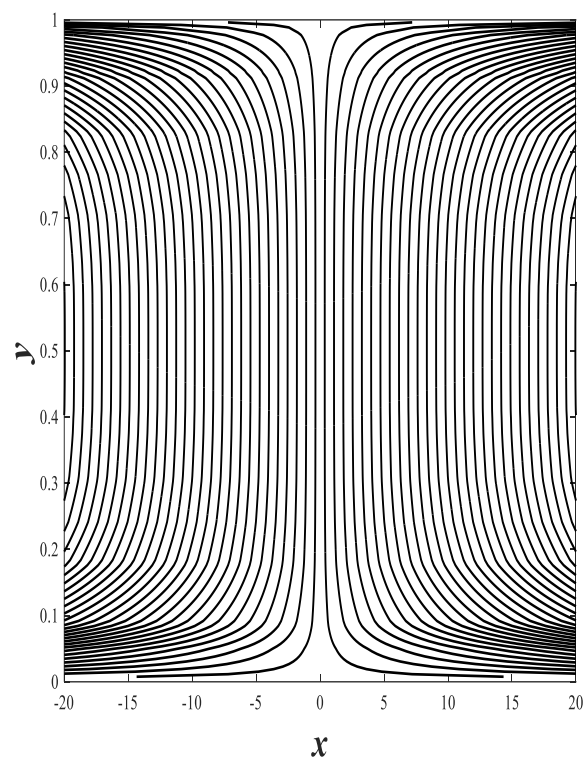


Figure 32. Stream lines profile at $F = 0.8$.

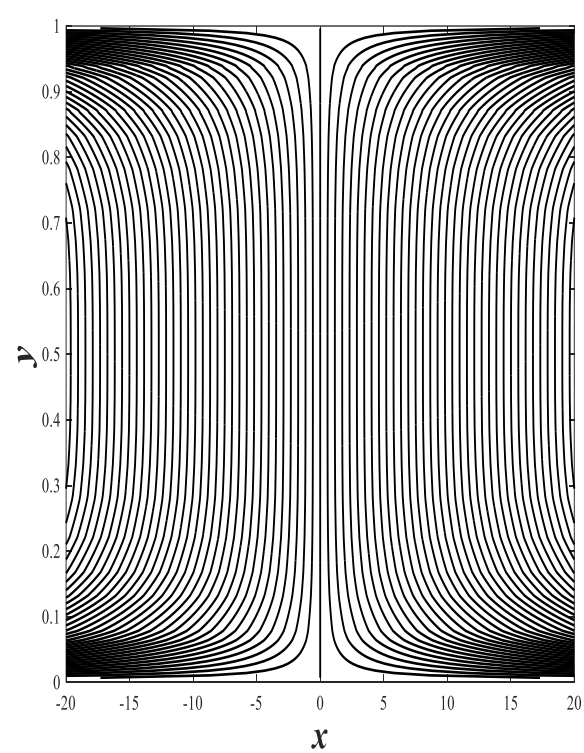


Figure 33. Stream lines profile at $F = 1$.

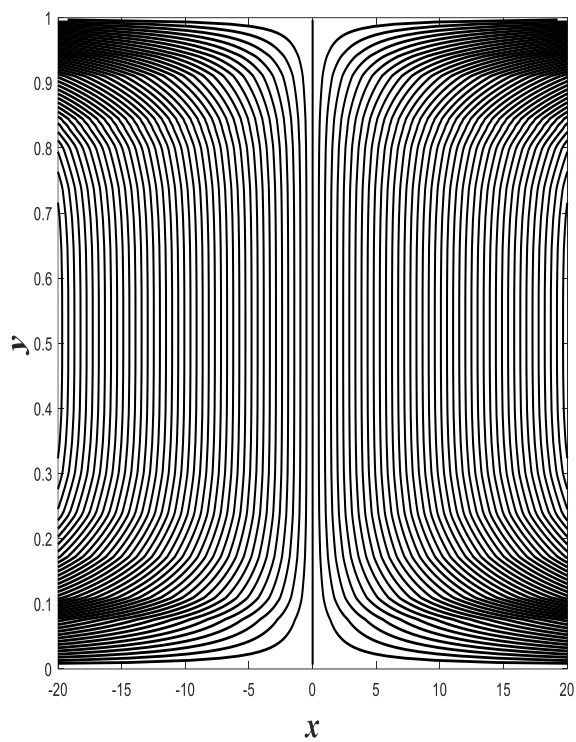


Figure 34. Stream lines profile at $F = 1.2$.

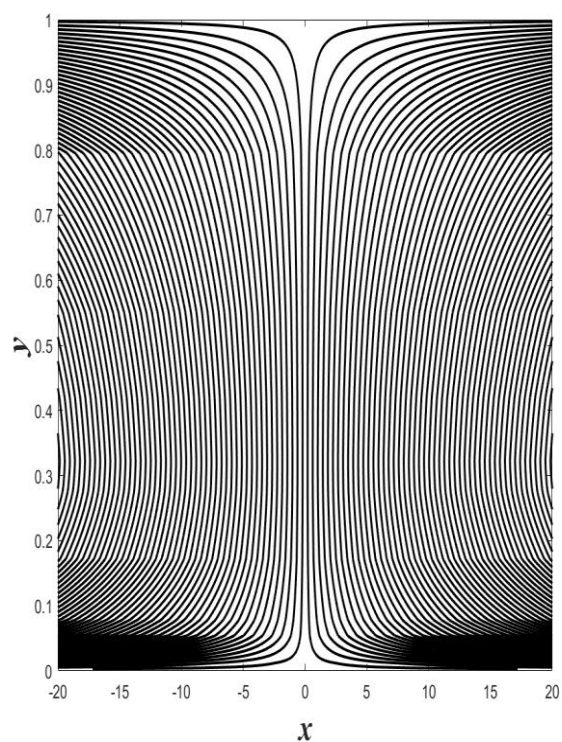


Figure 35. Stream lines profile at $F = 1.4$.

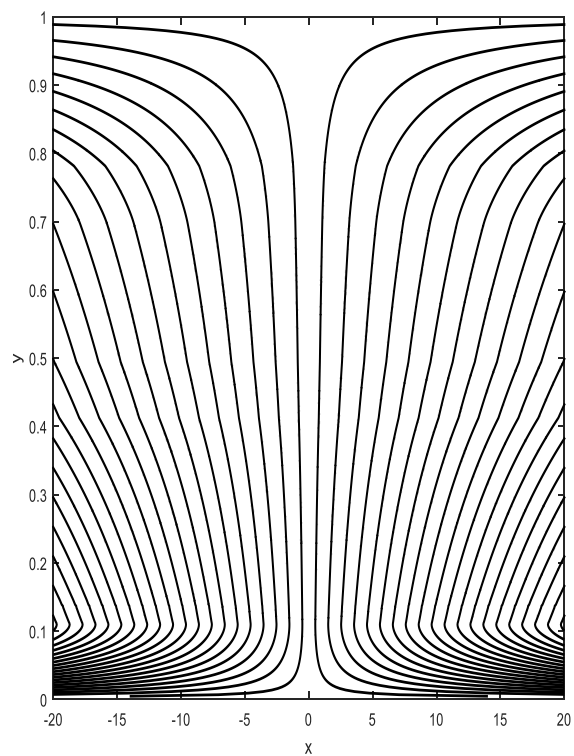


Figure 36. Stream lines profile at $F = 0.6$ and $M = 1.5$.

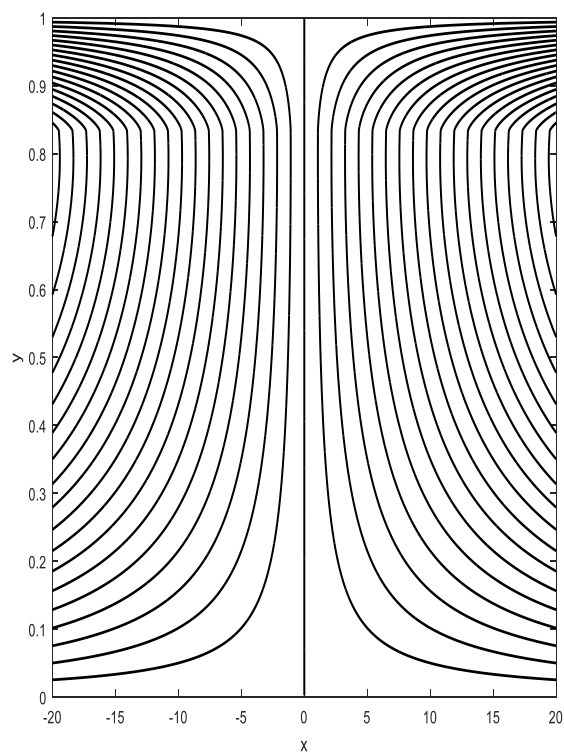


Figure 37. Stream lines profile at $F = 0.6$ and $M = 2.5$.

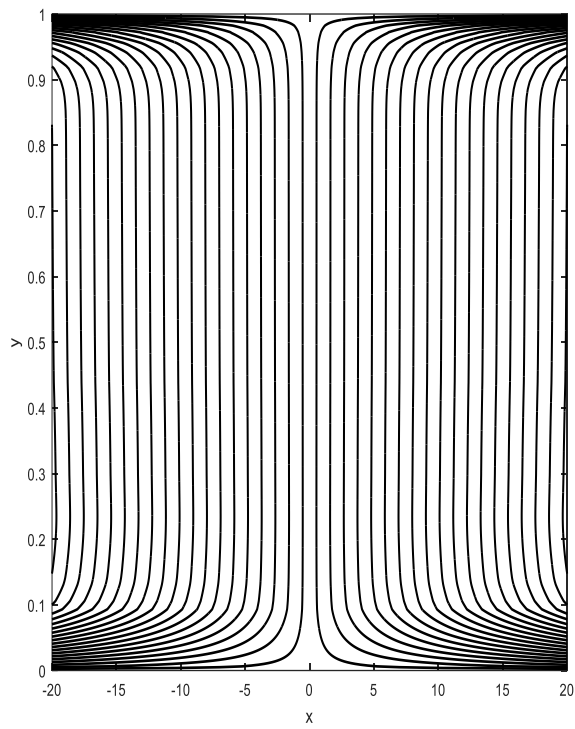


Figure 38. Stream lines profile at $F = 0.6$ and $Da = 1$

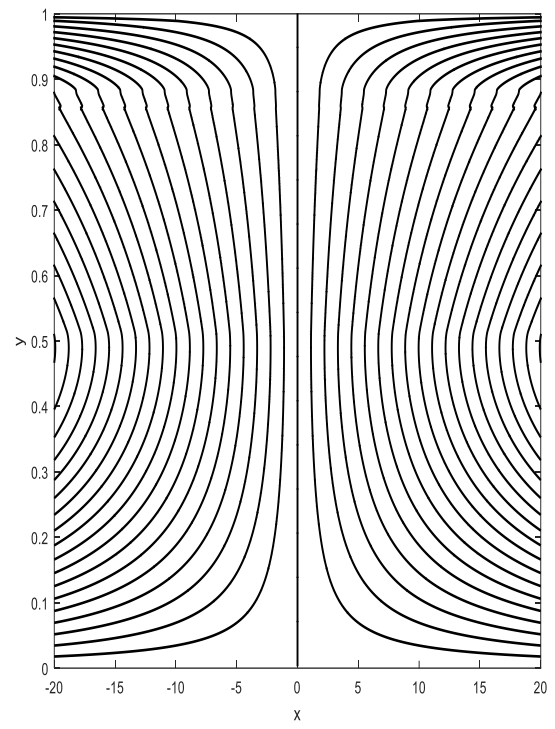


Figure 39. Stream lines profile at $F = 0.6$ and $Da = 1.5$.

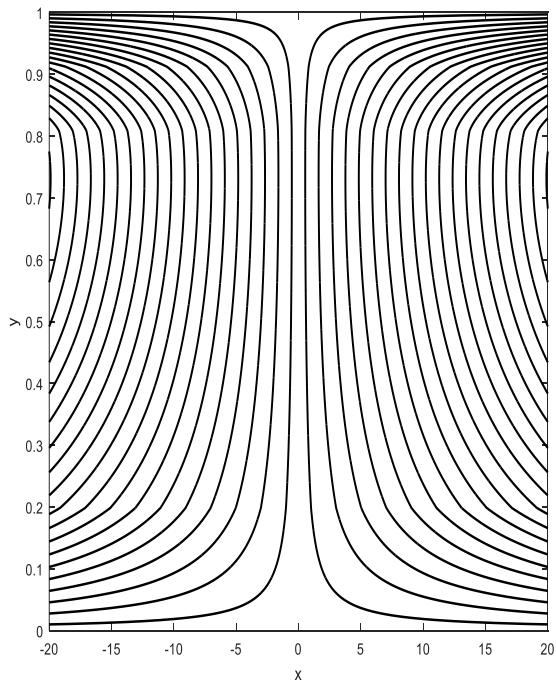


Figure 40. Stream lines profile at $F = 0.6$ and $\Omega = 0.5$.

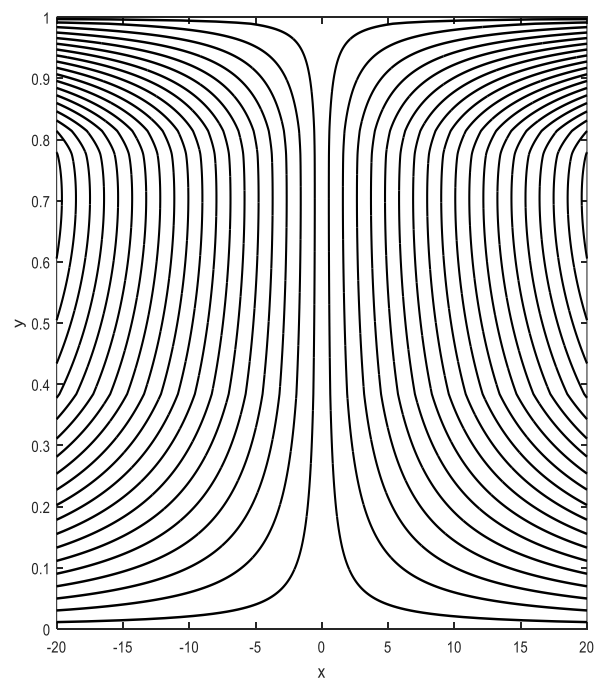
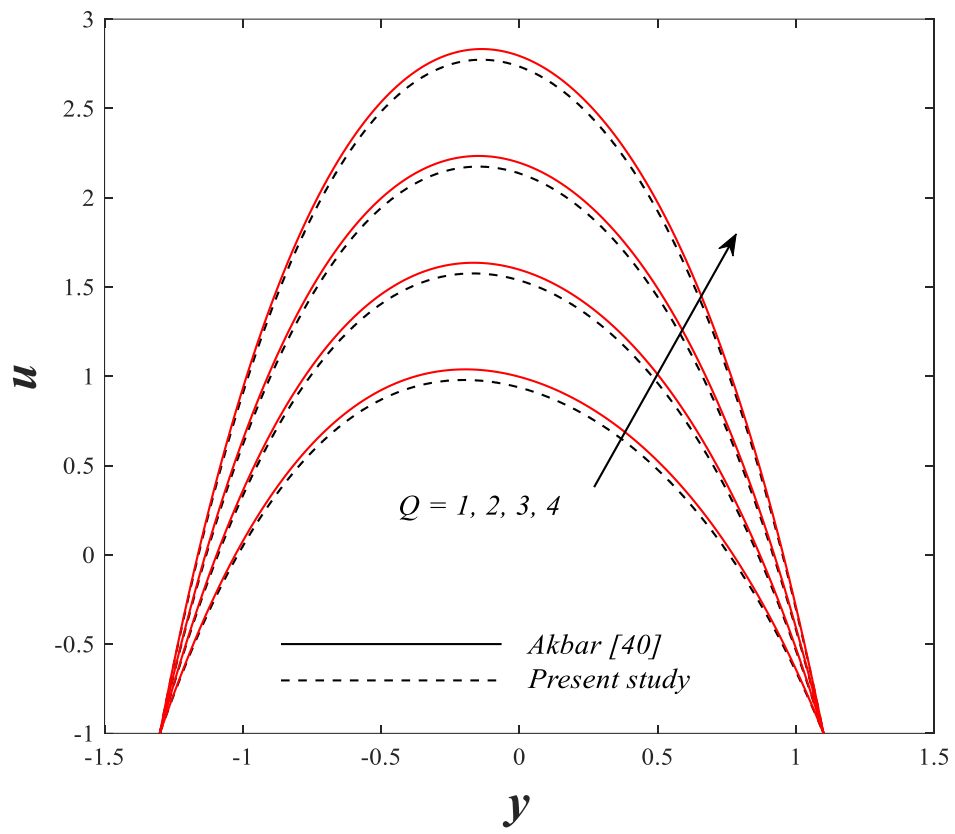
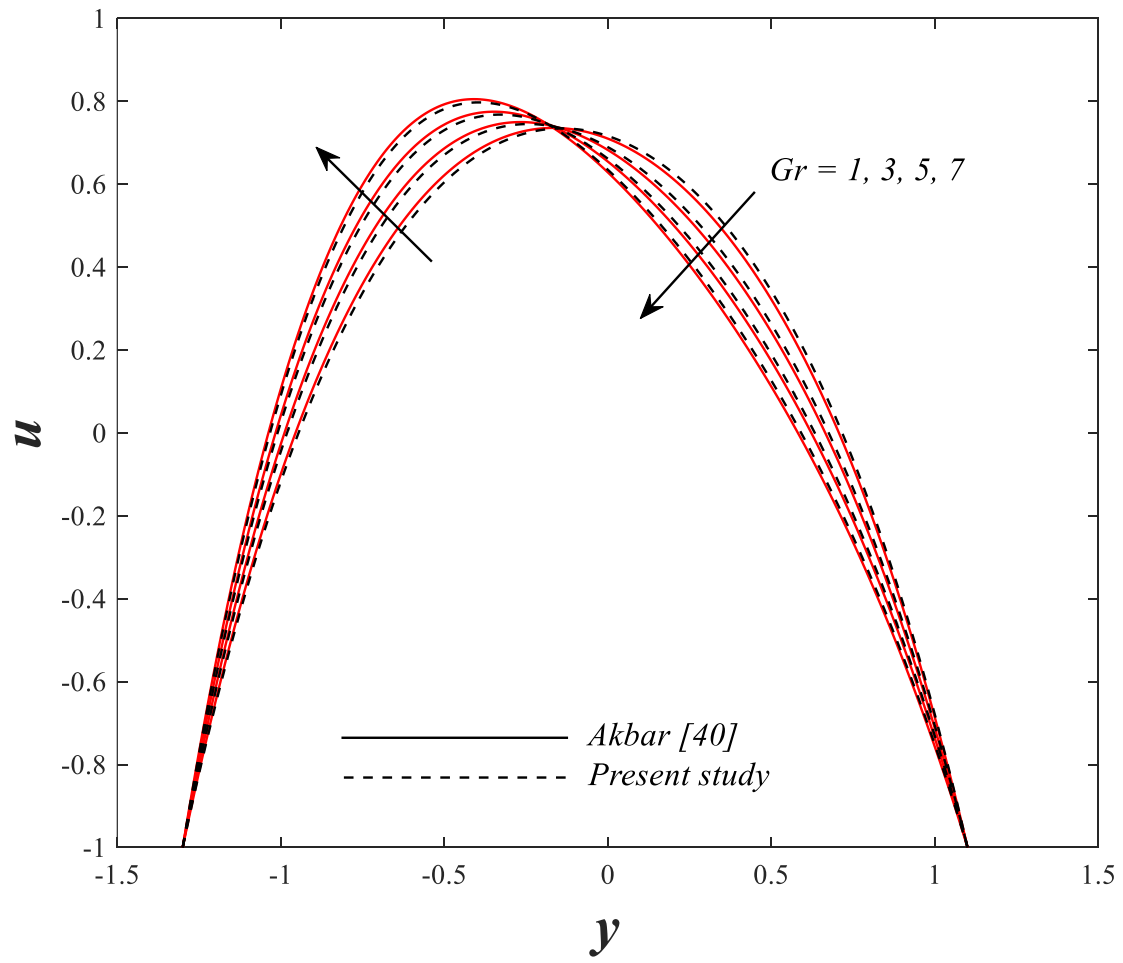


Figure 41. Stream lines profile at $F = 0.6$ and $\Omega = 1$.



Figures 42: Comparison between Akbar [40] and present study.



Figures 43: Comparison between Akbar [40] and present study.