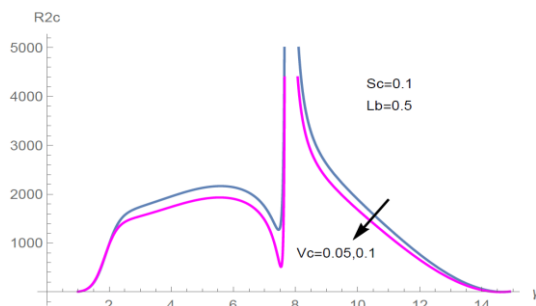
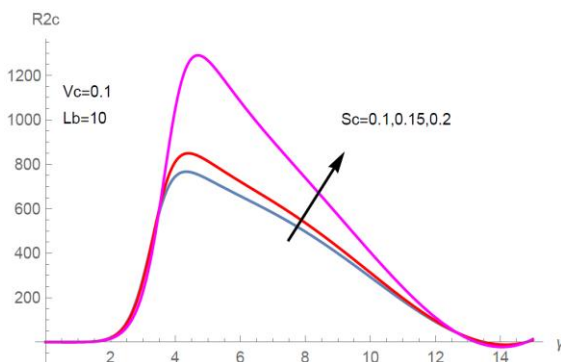


(a) γ Vs R_{2c} for different values of R_b

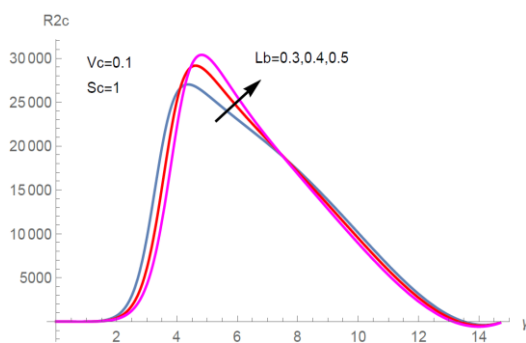


(b) γ Vs R_{2c} for different values of V_c

Figure 5



(a) γ Vs R_{2c} for different values of Sc



(b) γ Vs R_{2c} for different values of L_b

Figure 6

7. CONCLUSION

From the study of thermal modulation of a fluid containing gyrotactic microorganisms, the following conclusions can be drawn:

1. In the case of in-phase modulation, the maximum stability is achieved at $\gamma_c = 9$. When $\gamma < \gamma_c$ modulation effect is increases, for $\gamma_c < \gamma$ effect of modulation increases.
2. The system is the most stable when the modulation is out-of-phase.
3. The study of temperature modulation enables us to advance or delay the convection.
4. The suspended gyrotactic microorganisms decreases the effect of modulation.
5. As $\gamma \rightarrow \infty$, $R_{2c} \rightarrow 0$

REFERENCES

- [1] G. Venezian, 1969 "Effect of modulation on the onset of thermal convection," Journal of Fluid Mechanics, vol. 35, no. 2, pp. 243–254.
- [2] R. J. Donnelly, 1964 "Experiments on the stability of viscous flow between rotating cylinders iii. enhancement of stability by modulation," Proc. R. Soc. Lond. A, vol. 281, no. 1384, pp. 130–139.
- [3] S. Rosenblat and G. Tanaka, 1971 "Modulation of thermal convection instability," The Physics of Fluids, vol. 14, no. 7, pp. 1319–1322.
- [4] B. Bhadauria, P. Siddheshwar, and O. P. Suthar, 2012 "Nonlinear thermal instability in a rotating viscous fluid layer under temperature/gravity modulation," Journal of Heat Transfer, vol. 134, no. 10, p. 102502.
- [5] B. Bhadauria, P. Siddheshwar, J. Kumar, and O. P. Suthar, 2012 "Weakly nonlinear stability analysis of temperature/gravity-modulated stationary rayleigh-bénard convection in a rotating porous medium," Transport in porous media, vol. 92, no. 3, pp. 633–647.
- [6] S. Pranesh and S. George, 2010 "Effect of magnetic field on the onset of rayleigh-bénard convection in boussinesq- stokes suspensions with time periodic boundary temperatures," International Journal of Applied Mathematics and Mechanics, vol. 6, no. 16, pp. 38–55.
- [7] S. Pranesh and R. Baby, 2012 "Effect of non-uniform temperature gradient on the onset of rayleigh-bénard electro convection in a micropolar fluid," Applied Mathematics, vol. 3, no. 05, p. 442

- [8] P. Siddheshwar and S. Pranesh,2000 “Effect of temperature/gravity modulation on the onset of magneto- convection in electrically conducting fluids with internal angular momentum,” *Journal of magnetism and magnetic materials* , vol. 219, no. 2, pp. 153–162.
- [9] H. Wager,1911 “On the effect of gravity upon the movements and aggregation of euglena viridis, ehrb, and other micro-organisms,” *Philosophical Transactions Of The Royal Society Of London Series B-Containing Papers Of A Biological Character* , no. 201.
- [10] J. R. Platt,1961 “Bioconvection patterns in cultures of free-swimming organisms,” *Science* , vol. 133, no. 3466, pp. 1766–1767.
- [11] T. Pedley, N. Hill, and J. Kessler,1988 “The growth of bioconvection patterns in a uniform suspension of gyrotactic micro-organisms”
- [12] N. Hill, T. Pedley, and J. Kessler,1989 “Growth of bioconvection patterns in a suspension of gyrotactic micro- organisms in a layer of”
- [13] S. Ghorai and N. A. Hill,1999 “Development and stability of gyrotactic plumes in bioconvection,” *Journal of Fluid Mechanics* , vol. 400, pp. 1–31.
- [14] S. Ghorai and N. A. Hill,2000 “Wavelengths of gyrotactic plumes in bioconvection,” *Bulleting of Mathematical Biology* , vol. 62, pp. 429–450.
- [15] A. Kuznetsov,2005 “The onset of bioconvection in a suspension of gyrotactic microorganisms in a fluid layer of finite depth heated from below,” *International Communications in Heat and Mass Transfer* , vol. 32, no. 5, pp. 574–582.
- [16] P. K. Srimani and M. C. Roopa,2011 “The cumulative effect of rotation on the onset of bio-porousconvection in a suspension of gyrotactic microorganisms in a layer of finite depth under adverse temperature gradient,” *International Journal of Current Research* , vol. 3, no. 7, pp. 204–210.
- [17] P. K. Srirami and Sujatha D.,2012 “The effect of rotational constraint on thermo-bioconvection in a suspension gravitactic microorganisms- a numerical study”, *International Journal of Current Research* , vol. 4, no. 3, pp. 126–131.