



**THE EFFECT OF SOLUTE CONCENTRATION POSITION ON  
BENARD-MARANGONI CONVECTION IN A HORIZONTAL  
FLUID LAYER HEATING FROM ABOVE IN THE PRESENCE  
OF NON-LINEAR MAGNETIC FIELD AND SOLUTE**

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**Abstract**

Linear stability analysis is applied to the system consisting of a horizontal layer which contains conducting fluid, affected by vertical non-linear magnetic field and solute, the fluid with uniform heating from above. Flow in a fluid layer is assumed to be governed by Navier-Stokes equation. From the numerical solutions obtained via using the method of expansion of Chebyshev polynomials, it is found that there are two modes of instability, stationary when the solute concentration effected from below and overstability when solute concentration effected from above. Furthermore, we found that there is no effect of a non-linear relationship between the magnetic field and the magnetic induction in the case of stationary convection. However, in the case of overstability convection an effect appears.

**Keywords and phrases:** Marangoni convection, magnetic fluid, Chebyshev method.

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