THREE DIMENSIONAL OSCILLATING FLOW BETWEEN TWO PARALLEL PLATES WITH HEAT TRANSFER

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The unsteady viscous incompressible Couette flow between two parallel plates when the upper plate oscillates in its own plane and is subjected to a constant suction whereas the lower plate is subjected to a suction velocity distribution has been theoretically analyzed. An approximate solution has been obtained using perturbation technique. It is found that the main flow velocity increases with an increase in the Reynolds number as well as suction parameter but it decreases with an increases in the frequency parameter. It is also shown that with an increase in the Reynolds number, the magnitude of the cross velocity increases near the stationary plate but decreases near the oscillating plate. On the other hand, it increases with an increase in the suction parameter. The heat transfer characteristic has also been studied by taking viscous dissipation into account. It is found that the temperature increases with an increase in the Reynolds number as well as the Prandtl number but it decreases with an increase in the frequency parameter.

Key words: Couette flow, three-dimensional, suction, transverse sinusoidal.

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