

A NUMERICAL INVESTIGATION OF THE FLOW IN A FULLY BLOCKED DIFFERENTIALLY HEATED ROTATING FLUID ANNULUS.

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Abstract

A computational model has been used to determine the terms in the dynamical equations which are responsible for the formation of a certain horizontal circulation seen in a simply connected, differentially heated rotating fluid annulus.

Experiments with a differentially heated rotating fluid annulus that is fully blocked by a thin, rigid, vertical radial barrier at rotation rates of up to 5 rad/sec and with an externally applied radial temperature difference of 4 or 10°C show two principal circulations. This paper is concerned with the mechanism for one of those circulations, which occurs in a horizontal plane. Computer modelling shows that this circulation is caused by small radial temperature gradients in the fluid, rather than centrifugal effects.