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AN EXPERIMENTAL AND THEORETICAL
INVESTIGATION ON A ROTARY PLUNGER TYPE
VACUUM PUMP

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A rotary positive displacement vacuum pump with its suction and delivery pipes is simulated on a digital computer. The performance characteristics of the machine under different operating conditions are compared with the experimental results.

Being a positive displacement machine, the vacuum pump creates an unsteady flow in the connected pipes. The modelling of unsteady flow in pipes is made keeping the non-linear character of the flow. The governing equations in the pipes are solved using method of characteristics, taking the effects of friction and heat transfer into account. The detailed kinematic analysis of the vacuum pump is presented. The thermodynamic analysis at different sweep angles is then discussed considering the leakage through clearances.

The theoretical indicator diagrams on pipes are compared with the experimental measurements.