ABSTRACT

Review of the steady-state analysis of torque transmission shows that the expression for torque transmission by hydrodynamic drive is dependent upon a proper choice of the value of empirical coefficient of flow friction which has a wide range of values. A three-dimensional analysis is developed using the toroidal coordinates in which the most appropriate mathematical model is framed and the mechanics of the incompressible viscous fluid is studied for flow in channels of high curvature and in rotating channels of high curvature. The case of helical blades is also considered. The developed solution is used to replace the elementary analysis. It is predicted that the introduction of secondary loss coefficient will suitably account for the variation of the coefficient of flow friction. This is also later experimentally verified. An experiment on flow visualisation shows the existence of secondary flow phenomenon at low speed values and there disappearance at high slip values.

In the analysis of vibration damping in hydro-dynamic drives a solution is developed for the non-linear equations of motion of the lumped equivalent two rotor systems coupled by the flow losses and secondary losses. It is seen that for small disturbances at the input the vibration is completely damped out at the output which is confirmed by various experiments.