

ABSTRACT

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In this thesis the existence of resonant modes in coreless DC servomotors is experimentally shown. As far as we know, these effects have not been previously reported in publications or technical documents by manufacturers of these type of servomotors. It has also been observed that the resonant frequency is variable and possibly dependent on the motor temperature. Traditional techniques applied in motor control can not be effective to deal with resonant modes as shown by simulations. In order to damp the resonance and control the motor shaft speed (and position), sliding mode controllers based on switching functions obtained from high gain observers are developed. These controllers are robust to parametric uncertainties and disturbances. The advantages and limitations of each controller are shown by simulations.

Keywords: Coreless DC Motor. Ironless DC Motor. Resonant Modes. Sliding Mode Control. High Gain Observer. State Filters. State Feedback Control.