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Investigation into the use of variable speed drives to damp mechanical oscillations

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Abstract

An investigation was conducted into how a variable speed drive can provide a damping torque when mechanical oscillations are present. The modeling of mechanical oscillations via an analogous electrical circuit was performed. Simulation was used to demonstrate how a variable speed drive is able to damp speed oscillations using Direct Torque Control (DTC). Damping of mechanical oscillations is done by means of the variable speed drive providing a damping torque component that is in-phase with the speed deviation. The simulation showed that by applying a small torque component with the speed variation results in torque oscillations being damped by 60% after the initial disturbance. Damping is further improved by applying a torque component equal to the speed variation resulting in the oscillations being damped by 80% when compared to the initial disturbance.