

5. Conclusions

The objective of this work was to explain and analyze computer aided feedback control design of a VSI-fed PMSM drive system with active load, to address related issues, and to propose solutions. For that purpose, the motor drive system simulation model was developed and verified through lab measurements. A two stage (cascade) digital feedback controller was used for the analysis. The design was divided in three areas: modeling, small-signal design, large-signal design and its extracted part - flux-weakening control.

A detailed digital-feedback-control design analysis, which included system stability issues, voltage limiter design guidance, comparative analysis of modern flux-weakening control methods, and new mixed level simulation modeling technique for motor drives, are the main accomplishments of this work. But its biggest contribution is having them all together on one place - in a single master's thesis project - so that a concise, but complete motor drive design for this specific application is available to a reader.

Future research in the areas of the adaptive and robust control of systems with active load, voltage limiter design, and flux-weakening control methods, is a natural continuation of this work.

The author's hope is that the above-mentioned accomplishments can serve as a small contribution to future (mainly student) research in this wider and more interesting than expected, but less explored than expected area - the modeling and control of motor drive systems with active load.