According to the figures 8. c and 8.d the variation of the machine setting has a big effect on the i_q and id currents, and also on the torque. Therefore, this technique of control is very sensitive to the variation of the machine settings.
During the inversion of the rotation speed (figure 8. a), the robustness of the PI regulator is not perfect.

6 Conclusions

The permanent magnet synchronous motor PMSM is an electric actuator of great industrial interest, due to its compactness, low inertia, efficiency, robustness, and high-power density, but its non-linear structure makes its control more complex, which led us to use the non-linear control model that can provide good performance. The application of the PI regulator of PMSM is widely used in the industry because of its simplicity. However, this type of regulator has several disadvantages which push researchers to develop new non-linear control laws.

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