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1.5. Vector transformations and dynamic models in the α - β and d-q reference frames (sinusoidal field distribution machines with non-salient and salient poles)1.5.1. Factorized matrix modeling; 1.5.2. Concordia transformation: α - β reference frame; 1.5.3. Park transformation, application to the synchronous salient pole motor; 1.5.4. Note on the torque coefficients; 1.6. Can we extend the Park transformation to synchronous motors with non-sinusoidal field distributions?; 1.7. Conclusion; 1.8. Appendices; 1.8.1. Numerical values of the parameters; 1.8.2. Nomenclature and notations 1.8.3. Acknowledgments1.9. Bibliography; Chapter 2. Optimal Supply and Synchronous Motors Torque Control: Designs in the a-b-c Reference Frame; 2.1. Introduction: problems of the controls in a-b-c; 2.2. Model in the a-b-c reference frame: extension of the steady state approach in transient regime; 2.2.1. Case of sinusoidal field distribution machines; 2.2.2. Case of trapezoidal field distribution machines (brushless DC motor); 2.2.3. Note on the electromagnetic torque for non-sinusoidal machines; 2.3. Structures of torque controls designed in the a-b-c reference frame 2.3.1. Case of the sinusoidal distribution machine2.3.2. Extension to brushless DC motors (case of trapezoidal field distribution machines); 2.4. Performances and criticisms of the control approach in the a-b-c reference frame; 2.4.1. Case of a proportional control; 2.4.2. Case of an integral and proportional (IP) current regulation; 2.4.3. Interpretation in Park components of the IP controller designed in a-b-c; 2.4.4. Advanced controllers: example of the resonant controller; 2.4.5. Interpretation by Park transformation of the regulation by resonant controller 2.5. Generalization: extension of the supplies to the case of non-sinusoidal distribution machines

Sommario/riassunto

Synchronous motors are indubitably the most effective device to drive industrial production systems and robots with precision and rapidity. Their control law is thus critical for combining at the same time high productivity to reduced energy consumption. As far as possible, the control algorithms must exploit the properties of these actuators. Therefore, this work draws on well adapted models resulting from the Park's transformation, for both the most traditional machines with sinusoidal field distribution and for machines with non-sinusoidal field distribution which are more and more used in
