Control of Permanent Magnet Synchronous Motors

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OXFORD
University Press
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Please see the link to the book’s companion website at “http://www.oup.co.uk/companion/PMSCntrol2018” for additional materials, including:

- Preface
- Sample material from book
- Chapter summaries
Figure 1.1 A controlled PMS motor system including power supply, power converter, motor, and control system.
**Figure 1.2** Schematic view of a three-phase two-level voltage source inverter.

**Table 1.1** Inverter switching states.

<table>
<thead>
<tr>
<th>$S_a$</th>
<th>$T_1$</th>
<th>$T_4$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>0</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>$S_b$</td>
<td>$T_3$</td>
<td>$T_6$</td>
</tr>
<tr>
<td>1</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>0</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>$S_c$</td>
<td>$T_5$</td>
<td>$T_2$</td>
</tr>
<tr>
<td>1</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>0</td>
<td>OFF</td>
<td>ON</td>
</tr>
</tbody>
</table>
Figure 1.3 Principle of sinusoidal pulse wave modulation (only a small fraction of a cycle for sine modulating signals is shown).
Figure 1.4 Inverter voltage vectors.
Figure 1.5 Space vector modulation in terms of two inverter voltage vectors.
Figure 1.6 $B$–$H$ hysteresis loop of a typical hard magnetic material.
Figure 1.7 Demagnetization curve of a typical PM material in a machine.

Figure 1.8 Graphical representation of maximum energy product of a typical PM material in connection with its demagnetization curve.
The effect of the energy products of magnets with linear B–H demagnetization curves on a PM motor performance with three different energy product values and two different motor designs: torque vs speed (a) and output power vs speed (b) (Gutfleisch et al. 2011).
Figure 1.10 Temperature effect on demagnetization curve of PM materials.
Figure 1.11 Demagnetization characteristics of common PM materials.
### Table 1.2  Comparative properties of PM materials.

<table>
<thead>
<tr>
<th>PM material</th>
<th>Remanence</th>
<th>Coercivity</th>
<th>Energy product</th>
<th>Curie temperature</th>
<th>Price</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>NdFeB</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>Very high</td>
</tr>
<tr>
<td>SmCo</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Very high</td>
<td>Low</td>
</tr>
<tr>
<td>Ferrite</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Alnico</td>
<td>High</td>
<td>Very low</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
</tr>
</tbody>
</table>
Figure 1.12 Estimated breakdown of global permanent magnet value by type in 2010, total value: $9 bn (Gutfleisch et al. 2011).
Figure 1.13 *Breakdown of global permanent magnet sales by type during 1985–2020 (Dent 2012).*
Figure 1.14 *Estimated and forecasted worldwide production of NdFeB material by region during 2005–2020* (Benecki et al. 2010).

Figure 1.15 *The application of NdFeB magnets in terms of sectors in 2003 and 2008* (Kara et al. 2010).
Figure 1.16 IPM motors for automotive cooling fans, using ferrite (left) and NdFeB magnets (right) (Ding 2013).
Figure 1.17 Full load PMS motor efficiency in comparison with induction motor efficiency, illustrated from Baldor Electric (US Department of Energy 2014).
Induction motor (5.0 HP) 15,953 cm³

PM motor (5.0 HP) 4,698 cm³

70% Smaller in volume

Induction motor (5.0 HP) 45 kg

PM motor 18 kg

Comparison in motor weight (5.0 HP)

Figure 1.18 Advantages of PMS motors over induction motors: (a) size comparison and (b) weight comparison (Kang 2009), with permission from Yaskawa America, Inc.
Figure 1.19 PMS motor types based on the location of PM rotor poles: (a) surface-mounted, (b) inset, (c) interior, and (d) radial interior.
Figure 1.20  Permanent magnet poles mounted on the surface of the rotor core (Kikuchi and Kenjo 1997).

Figure 1.21  Rotor laminations of IPM motor with V-shaped poles used in 2010 Prius hybrid vehicle (Burress et al. 2011).

Figure 1.22  Magnetization orientations of motor poles: (a) radial, (b) parallel, (c) radial sinusoidal, and (d) sinusoidal angle.
Figure 1.23 Magnetic flux density distribution along the circumferential of the air gap for radial and parallel PM pole magnetizations (Shin-Etsu rare earth magnets).
Figure 1.24 Modulated PM poles: (a) surface-mounted poles and (b) interior type poles (Isfahani et al. 2008).
Figure 1.25 Flux density distribution of the PM poles (circled line) together with their fundamental components (solid line): (a) modular pole with both weak and strong field intensity PM materials, (b) conventional pole with weak magnetic field intensity PM material, and (c) conventional pole with strong magnetic field intensity PM material (Isfahani et al. 2008).
Figure 2.1 Schematic view of PMS machines with (a) surface-mounted poles and (b) interior poles.
Figure 2.2 Actual and assumed patterns of air gap flux density distribution produced by a pair of PM poles.
Figure 2.3 Presentation of machine phase variables in stator RF.
Figure 2.4 *A three-phase equivalent circuit model of PMS machines.*
Figure 2.5 A schematic view of a two-winding fictitious PMS machine.
Figure 2.6 System transformation from three-axis stationary (a–b–c) to two-axis stationary (D–Q) RF.
Figure 2.7 Equivalent circuit model of PMS machines in two-axis stationary RF: (a) D-axis circuit, (b) Q-axis circuit.
Figure 2.8 System transformation from two-axis stationary (D–Q) RF to rotor (d–q) RF.
Figure 2.9 System transformation from three-axis stationary (a–b–c) RF to rotor (d–q) RF.
Figure 2.10 A vector diagram of PMS machines.
Figure 2.11 Equivalent circuit model of PMS machines in rotor RF (a) d-axis circuit and (b) q-axis circuit.

Figure 2.12 Steady-state equivalent circuit model of PMS machines in rotor RF: (a) d-axis circuit and (b) q-axis circuit.
Figure 2.13 System transformation from rotor (d–q) RF to stator flux linkage (x–y) RF.
Figure 2.14 Presentation of a vector variable in a complex coordinate system.
Figure 2.15 The vector variable in terms of space vectors of phase variable components.
Figure 2.16 A space vector diagram of PMS machines.
Figure 2.17 A space vector equivalent circuit model of PMS machines in stationary RF.

Figure 2.18 A stationary RF to rotor RF transformation by space vector rotation.
Figure 2.19 A rotor RF to stator flux RF transformation by space vector rotation.
Figure 2.20 Steady-state equivalent circuit model of PMS machines in rotor RF including iron losses: (a) d-axis circuit and (b) q-axis circuit.
Figure 2.21 A dynamic system consisting of a PMS machine connected to a mechanical load.
More slides will be added