



DISEÑO DE UN SISTEMA DE CONTROL PREDICTIVO PARA EL ACCIONAMIENTO DE LA MÁQUINA DE RELUCTANCIA CONMUTADA DE UN SISTEMA DE ALMACENAMIENTO CINÉTICO PARA LA MEJORA DE LA EFICIENCIA EN LA EDIFICACIÓN

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CAPÍTULO 10. REFERENCIAS

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1. REFERENCIAS

- [1] Ley 38/1999, de 5 de noviembre, de Ordenación de la Edificación (LOE).
- [2] Código Técnico de la Edificación (CTE) aprobado por Real Decreto 314/2006, de 17 de marzo.
- [3] <http://www.mundoenergia.com/wwf-el-parlamento-europeo-propone-que-los-nuevos-edificios-sean-de-energia-cero.html>
- [4] http://www.wwf.es/que_hacemos/cambio_climatico/noticias/?8880/El-Parlamento-Europeo-propone-que-los-nuevos-edificios-sean-de-energia-cero
- [5] http://www.idae.es/index.php/mod.documentos/mem.descarga?file=/documentos_Plan_de_Accion_2008-2012_19-07-07_con_TABLAS_PDF_ACC_2936ad7f.pdf
- [6] EUR 19978 Brochure: “Energy Storage A Key Technology for Decentralized Power, Power Quality and Clean Transport”, 2001.
- [7] IEEE P1679™/D10 Draft Recommended Practice for the Characterization and Evaluation of Emerging Energy Storage Technologies in Stationary Applications. IEEE P1679/D10, November 2008
- [8] Tester, J. et al., Sustainable Energy: Choosing Among Options. MIT Press, 2005
- [9] Battery energy storage technology for power systems — An overview K.C. Divya and Jacob Østergaard, Electric Power Systems Research Volume 79, Issue 4, April 2009
- [10] Joseph and M. Shahidehpour, Battery energy storage systems in electric power systems, IEEE (2006)
- [11] R.S. Tahllam, S. Eckroad, Multimode battery energy storage for custom power applications, Proceedings of the IEEE Power Engineering Society Winter Meeting, 2(31) 31 January–4 February, 1999
- [12] T. Matsushime, S. Takagi, S. Muroyama, and T. Horie, “Fundamental characteristics of stationary lithium-ion secondary cells and a cell-management system” in Proc. INTELEC 2004
- [13] R. Bonert, L. Zubieta, “Characterization of Double-Layer Capacitors for Power Electronics Applications”, IEEE Transactions on industry applications, Vol. 36, January-February 2000

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- [14] P.J. Binduhewa, A.C. Renfrew, M. Barnes, 2008, "Ultracapacitor Energy Storage for MicroGrid Microgeneration", the 4th International Conference on Power Electronics, Machines and Drives
- [15] John M. Miller, "Ultracapacitor Efficiency under Constant Power Conditions: Prospects for Lithium Battery plus Ultracapacitor Hybrid Energy Storage Systems," 3rd International Symposium on Large Ultracapacitor Technology and Application (UCAP), Advanced Automotive Battery Conference, Hyatt Regency hotel, Long Beach, CA, 15-17 May 2007
- [16] http://www.beaconpower.com/products/EnergyStorageSystems/docs/BeaconPower_solutions_grid.pdf
- [17] H. Liu and J. Jiang, "Flywheel Energy Storage – An upswing Technology for Energy Sustainability", Elsevier Energy and Building, no. 39. pp. 599-604, 2007
- [18] B.Bolund, H. Bernhoff and M. Leijon, "Flywheel Energy and Power Storage Systems", Elsevier Renewable and Sustainable Energy Reviews, no. 11, pp. 235-258, 2007
- [19] <http://www.pentadyne.com/uploads/18/File/Application&ProductOverview.pdf>
- [20] S. Samineni, B.K. Johnson, H.L. Hess, J.D. Law, "Modeling and analysis of a flywheel energy storage system for voltage sag correction", *IEEE International Electric Machines and Drives Conference – IEMDC'03*, Volume 3, 1-4 June 2003, Page(s): 1813 – 1818.
- [21] G. Cimuca, M.M. Radulescu, C. Saudemont, B. Robyns, "Performance analysis of an induction machine-based flywheel energy storage system associated to a variable-speed wind generator", *Proceedings of the 9th International Conference on Optimization of Electrical and Electronic Equipments - OPTIM 2004*, Brasov, Romania, 20-22 May 2004.
- [22] R. Cardenas, R. Pena, G. Asher, J. Clare, R. Blasco-Giménez, "Control strategies for power smoothing using a flywheel driven by a sensorless vector-controlled induction machine operating in a wide speed range", *IEEE Transactions on Industrial Electronics*, vol. 51, n°3, June 2004, pp. 603-614.
- [23] Bitterly JG. Flywheel technology: past, present, and 21st century projections. *IEEE Aerospace Electron Syst Mag* 1998;13:13–6.
- [24] R. Hebner, J. Beno, A. Walls, "Flywheel batteries come around again", *IEEE Spectrum*, April 2002, pp. 46 – 51.
- [25] C. Rob Wagner, R. David Boyle and D. Kent, Commercialization of flywheel energy storage technology on the international space station, *Proceedings of the Intersociety Energy Conversion Engineering Conference, 2002 37th*

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Intersociety Energy Conversion Engineering Conference, IECEC Washington, DC, United States, July (2002), pp. 146– 150.

- [26] C.C. Chan, The state of the art of electric and hybrid vehicles, *Proceedings of the IEEE* 90 (2002) (2), pp. 247–275. Full Text via CrossRef | View Record in Scopus | Cited By in Scopus (130)
- [27] J. Van Mierlo, P. Van den Bossche and G. Maggetto, Models of energy sources for EV and HEV: fuel cells, batteries, ultracapacitors, flywheels and engine-generators, *Journal of Power Sources* 128 (2004) (1), pp. 76–89. Article | PDF (477 K) | View Record in Scopus | Cited By in Scopus (30)
- [28] R. Brown Daryl and D. Chvala William, Flywheel energy storage: an alternative to batteries for UPS systems, *Energy Engineering: Journal of the Association of Energy Engineering* 102 (2005) (5), pp. 7–26.
- [29] T.J.E. Miller. "Electronic control of Switched Reluctance Machines". Newnes Power Engineering series, Oxford 2001.
- [30] P.J. Lawrenson, J.M. Stephenson, P.T. Blenkinsop, J. Corda, N.N. Fulton. "Variable speed switched reluctance motors". IEE, Proc., Vol. 127, Pt B, Nº 4, July 1980.
- [31] W.F.Ray, R.M. Davis. "Inverter drive for doubly salient reluctance motor". IEE Electric Power Applications, 2 (6), 1979.
- [32] Tesis Doctoral: Aportaciones al diseño y a la caracterización del motor de reluctancia autoconmutado. Autor: Marcel Torrent Burgues, Director: Pere Andrada Gascón, Lectura: En la Universitat Politècnica de Catalunya (España) en 2002.
- [33] Tesis Doctoral: Contribución al control de motores de reluctancia autoconmutados. Autor: José Ignacio Perat Benavides, Director: Pere Andrada Gascón, Lectura: En la Universitat Politècnica de Catalunya (España) en 2006.
- [34] Tesis Doctoral: Desarrollo del sistema de almacenamiento de control de un almacenador cinético de energía con máquina de reluctancia conmutada. Autor: Cristina Vázquez Vélez, Director: Luis García-Tabarés y Bonifacio de Andrés, Lectura: En la Universidad Politécnica de Madrid (España) en 2007.
- [35] Van der Broek, H.; Gerling, D.; E.; Switched Reluctance Drive and PWM Induction Motor Drive Compared for Low Cost Applications, EPE'93, 6:71-76, Sept. 1993.
- [36] Gorasson, G.; Sjöberg, L.; Reinert, J.; *A Cost Optimised Direct Drive for Low-speed Industrial Applications*, EPE'01, CD-ROM, August 2001.

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- [37] Harris, M.R.; Finch, J.W.; Mallick, J.A.; Miller, T.J.E.; *A Review of the integral Horsepower Switched Reluctance Drive*, IEEE Trans. On Industry Applications, 22 (4), pp. 716-721, July/August 1986.
- [38] Kline, J.A.; *Opportunities for Switched Reluctance Drives*, Pulp and Paper Industry Technical Conference, 1999, 42-47, June 1999.
- [39] Lawrenson, P.J.; *A Brief Status of Switched Reluctance Drives*, EPE Journal, 2 (3), pp. 133-138, Oct. 1992.
- [40] Gao, U.; S.E.; Ehsani, M.; Thelen, R.F.; Hebner, R.E.; *Flywheel Electric Drive Characterization for Hybrid Vehicles*. International Journal of Electrical in Transportation, vol.1, nº1, 2005. pp.
- [41] Hofmann, H.; Sanders, S.R.; *Synchronous Reluctance Motor/Alternator for Flywheel Energy Storage Systems*. Proceedings of the 1996 IEEE Power Electronics in Transportation Workshop, pp. 199-206, 1996.
- [42] Calverley, S.D.; Jewell, G.W.; Saunders, R.J.; *Design of a High Speed Switched Reluctance Machine for Automotive Turbo-Generator Applications*, SAE Transactions, 108(2), pp. 3246-3255, 2000.
- [43] Hendershot, J.R.; *Ac Brushless and Switched Reluctance Motors Comparison*, Motion Control, 1-12, April 1991.
- [44] Miller, T.J.E.; *Optimal Design of Switched Reluctance Motors*, IEEE Trans. On Industrial Electronics, 49(1), pp. 15-27, Feb. 2002.
- [45] Brabandere, K.; Driesen, J.; Belmans, R.; *The Control of Switched Reluctance Drives and their Use for Flywheel Energy Storage System*, Procc. IEEE Young Researchers Symposium in Electrical Power Engineering, Distrinuted generation, Leuven, Belgium, Feb. 2002. CD-ROM
- [46] Iglesias, I.J.; García-Tabarés, L.; Agudo, A.; Cruz, I.; Arribas, L.; *Design and Simulation of a Stand-alone Wind-Diesel Generator with a Flywheel Energy Storage System to Supply the Requerid Active and Reactive Power*, Power Electronics Specialists Conference 2000, PESC00, IEEE 31st Annual, vol. 3, pp. 1381-1386.
- [47] T.J.E. Miller. "Switched reluctance motors and their control". Magna Physics Publishing and Clarendon Press, Oxford 1993.
- [48] F. Castellana, P. Andrada, E. Martínez, I. Perat, M. Torrent. "Motores de reluctancia autoconmutados (Switched Reluctance Motors)". Theknos, Marzo-Abril 1994, Barcelona.
- [49] J.I. Perat, B. Blanqué, M. Torrent, P. Andrada, J.A. Sanchez. "Comparación de controladores analógicos para accionamientos de bajo coste" SAAEI'02, 18-20 de Septiembre 2002, Alcalá de Henares.

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- [50] A versatile nonlinear switched reluctance motor model in Simulink using realistic and analytical magnetization characteristics. Le-Huy, H.; Brunelle, P. Industrial Electronics Society, 2005. IECON 2005. 31st Annual Conference of IEEE Volume , Issue , 6-10 Nov. 2005 Page(s): 6 pp.
- [51] J. Corda, J.M. Stephenson. "Analytical estimation of the minimum and maximum inductances of a double-salient motor". Leeds, 1979.
- [52] N. J. Nagel, R.D. Lorenz. "Modeling of a saturated switched reluctance motor using an operating point analysis and the unsaturated torque equation". IEEE Transactions on Industry Applications, Vol. 36, Nº 3, Mayo-Junio 2000, pp 714-722.
- [53] D.A. Torrey, J.H. Lang. "Modelling a nonlinear variable-reluctance motor drive". IEE Proceedings, Vol.137, Pt.B, Nº 5, Septiembre 1990.
- [54] Dynamic simulation of a switched reluctance motor drive on EMTDC/PSCAD software. Autores: I. El-Samahy, M.I. Marei, E.F. El-Saadany. Power Engineering Society General Meeting, 2005. IEEE. 12/07/2005;
- [55] Analytical modelling of variable-reluctance machine magnetisation characteristics. Autores: TORREY D. A.; NIU X.-M. ; UNKAUF E. J. ; IEE proceedings. Electric power applications, 1995, vol. 142, nº1, pp. 14-22
- [56] R.B. Inderka, R.W.A.A. De Doncker "Direct instantaneous torque control for switched reluctance drives". IEEE Transactions on Industrial Electronics, Vol.39,Nº4, Julio/Agosto 2003.
- [57] Helfried Peyrl, Georgios Papafotiou, Manfred Morari, "Model predictive torque control of a Switched Reluctance Motor," icit, pp.1-6, 2009 IEEE International Conference on Industrial Technology, 2009