

REFERENCES

- [1] IEA-PVPS, "Trends in Photovoltaic Applications. Survey Report of Selected IEA Countries Between 1995 and 2011," International Energy Agency – Photovoltaic Power Systems Program, Tech. Rep. IEA PVPS T1-21:2012, August 2012.
- [2] Soeren Baekhoej Kjaer, Member, IEEE, John K. Pedersen, Senior Member, IEEE, and Frede Blaabjerg, Fellow, IEEE, "A Review of Single-Phase Grid-Connected Inverters for Photovoltaic Modules," *IEEE Transactions on Industry Application*, vol.41, No. 5, pp 1292-1306. Sep./Oct. 2005.
- [3] A. Schlumberger; "Market Survey on Inverters 2007"; *Photon International*, vol. 4, 2007.
- [4] M. Calais, J. Myrzik, T. Spooner, and V. G. Agelidis, "Inverter for Single-phase Grid Connected Photovoltaic Systems—An Overview," in *Proc. Power Electron. Spec. Conf.*, Feb. 2002, vol. 4, pp. 1995–2000.
- [5] M. Meinhardt and G. Cramer, "Multi-string Converter: The Next Step in Evolution of String-converter Technology," in *Proc. 9th Eur. Conf. Power Electron. Appl.*, Graz, Austria, 2001.
- [6] G. R. Walker and P. C. Sernia, "Cascaded dc/dc Converter Connection of Photovoltaic Modules," *IEEE Trans. Power Electron.*, vol. 19, no. 4, pp. 1130–1139, Jul. 2004.
- [7] J.-M. Kwon, B.-H. Kwon, and K.-H. Nam, "Grid-connected Photovoltaic Multistring PCS With PV Current Variation Reduction Control," *IEEE Trans. Ind. Electron.*, vol. 56, no. 11, pp. 4381–4388, Nov. 2009.

- [8] M. Malinowski, K. Gopakumar, J. Rodriguez, and M. A. Pérez, "A Survey on Cascaded Multilevel Inverters," *IEEE Trans. Ind. Electron.*, vol. 57, no. 7, pp. 2197–2206, Jul. 2010.
- [9] M. Calais, V. G. Agelidis, and M. Meinhardt, "Multilevel Converter for Single-phase Grid-connected Photovoltaic Systems: An Overview," *Sol. Energy*, vol. 66, no. 5, pp. 325–335, Aug. 1999.
- [10] J. Rodríguez, J. S. Lai, and F. Z. Peng, "Multilevel Inverters: A Survey of Topologies, Controls and Applications," *IEEE Trans. Ind. Electron.*, vol. 49, no. 4, pp. 724–738, Aug. 2002.
- [11] L. G. Franquelo, J. Rodriguez, J. I. Leon, S. Kouro, R. Portillo, and M. A. M. Prats, "The Age of Multilevel Converters Arrives," *IEEE Ind. Electron. Mag.*, vol. 2, no. 2, pp. 28–39, Jun. 2008.
- [12] G. Grandi, C. Rossi, D. Ostojic, and D. Casadei, "A New Multilevel Conversion Structure for Grid-connected PV Applications," *IEEE Trans. Ind. Electron.*, vol. 56, no. 11, pp. 4416–4426, Nov. 2009.
- [13] S. Busquets-Monge, J. Rocabert, P. Rodriguez, S. Alepuz, and J. Bordonau, "Multilevel Diode-clamped Converter for Photovoltaic Generators with Independent Voltage Control of Each Solar Array," *IEEE Trans. Ind. Electron.*, vol. 55, no. 7, pp. 2713–2723, Jul. 2008.
- [14] H. Ertl, J. Kolar, and F. Zach, "A Novel Multicell DC–AC Converter for Applications in Renewable Energy Systems," *IEEE Trans. Ind. Electron.*, vol. 49, no. 5, pp. 1048–1057, Oct. 2002.
- [15] O. Alonso, P. Sanchis, E. Gubía, and L. Marroyo, "Cascaded H-bridge Multilevel Converter for Grid Connected Photovoltaic Generators with Independent Maximum Power Point Tracking of Each Solar Array," in *Proc. IEEE Power Electron. Spec. Conf.*, 2003, pp. 731–735.

- [16] J. J. Negroni, F. Guinjoan, C. Meza, D. Biel, and P. Sanchis, "Energy Sampled Data Modeling of a Cascaded H-bridge Multilevel Converter for Grid-connected PV Systems," in Proc. 10th IEEE Int. Power Electron. Congr., 2006, pp. 1–6.
- [17] A. Dell'Aquila, M. Liserre, V. Monopoli, and P. Rotondo, "Overview of PI-based Solutions for the Control of DC Buses of a Single-phase H-bridge Multilevel Active Rectifier," IEEE Trans. Ind. Appl., vol. 44, no. 3, pp. 857–866, May/Jun. 2008.
- [18] E. Villanueva, P. Correa, J. Rodríguez, and M. Pacas, "Control of a Single-phase Cascaded H-bridge Multilevel Inverter for Grid-connected Photovoltaic Systems," IEEE Trans. Ind. Electron., vol. 56, no. 11, pp. 4399–4406, Nov. 2009.
- [19] J. Selvaraj and N. A. Rahim, "Multilevel Inverter for Grid-connected PV System Employing Digital PI Controller," IEEE Trans. Ind. Electron., vol. 56, no. 1, pp. 149–158, Jan. 2009.
- [20] C. Cecati, F. Ciancetta, and P. Siano, "A Multilevel Inverter for Photovoltaic Systems with fuzzy logic control," IEEE Trans. Ind. Electron., vol. 57, no. 12, pp. 4115–4125, Dec. 2010.
- [21] J. J. Negroni, D. Biel, F. Guinjoan, and C. Meza, "Energy-balance and Sliding Mode Control Strategies of a Cascaded H-bridge Multilevel Converter for Grid-connected PV Systems," in Proc. IEEE Int. Conf. Ind. Technol., 2010, pp. 1155–1160.
- [22] C. Cecati, A. Dell'Aquila, M. Liserre, and V. Monopoli, "A Passivity Based Multilevel Active Rectifier with Adaptive Compensation for Traction Applications," IEEE Trans. Ind. Appl., vol. 39, no. 5, pp. 1404–1413, Sep./Oct. 2003.

- [23] D. Noriega-Pineda and G. Espinosa-Perez, "Passivity-based Control of Multilevel Cascaded Inverters: High Performance with Reduced Switching Frequency," in Proc. IEEE ISIE, Jun. 2007, pp. 3403–3408.
- [24] W. Xiao and W. G. Dunford, "A Modified Adaptive Hill Climbing MPPT Method for Photovoltaic Power Systems," in Proc. 35th Annu. IEEE Power Electron. Spec. Conf., 2004, pp. 1957–1963.
- [25] N. Femia, G. Petrone, G. Spagnuolo, and M. Vitelli, "Optimization of Perturb and Observe Maximum Power Point Tracking Method," IEEE Trans. Power Electron., vol. 20, no. 4, pp. 963–973, Jul. 2005.
- [26] Fangrui Liu; Shanxu Duan; Fei Liu; Bangyin Liu; Yong Kang, "A Variable Step Size INC MPPT Method for PV Systems," IEEE Trans. Ind. Electron., vol. 55, no. 7, pp. 2622-2628, Jul. 2008.
- [27] ESRAM, T.; Chapman, P.L., "Comparison of Photovoltaic Array Maximum Power Point Tracking Techniques," IEEE Trans. Ener. Convers., vol. 22, no. 2, pp. 439-449, Jun. 2007.
- [28] ESRAM, T.; Kimball, J.W.; Krein, P.T.; Chapman, P.L.; Midya, P., "Dynamic Maximum Power Point Tracking of Photovoltaic Arrays Using Ripple Correlation Control," IEEE Trans. on Power Elec., vol. 21, no. 5, pp. 1282-1291, Sep. 2006.
- [29] Casadei, D.; Grandi, G.; Rossi, C., "Single-phase Single-stage Photovoltaic Generation System Based on a Ripple Correlation Control Maximum Power Point Tracking," IEEE Trans. Ener. Convers., vol. 21, no. 2, pp. 562-568, Jun. 2006.
- [30] Kimball, J.W.; Krein, P.T., "Digital Ripple Correlation Control for Photovoltaic Applications," in Proc. IEEE Power Electron. Spec. Conf., EPSC 2007 pp. 1690–1694.

- [31] Kadri, R.; Gaubert, J.-P.; Champenois, G., “An Improved Maximum Power Point Tracking for Photovoltaic Grid-Connected Inverter Based on Voltage-Oriented Control” *IEEE Trans. Ind. Electron.*, vol. 58, no. 1, pp. 66-75, Jan. 2011
- [32] S. R. Bowes, “New Sinusoidal Pulse-width Modulated Inverter,” *Proc. Inst. Elect. Eng.*, vol. 122, no. 11, pp. 1279–1285, 1975.
- [33] M. G. Villalva, J. R. Gazoli, E. Ruppert F, “Modeling and Circuit-Based Simulation of Photovoltaic Array,” *Brazilian Journal of Power Elec.*, vol.14, no. 1, pp. 35-45, 2009.
- [34] R. Rawat, S. Chandel, “Review of Maximum-Power-Point Tracking Techniques for Solar-Photovoltaic Systems,” *Journal of Energy Technology.*, *Energy Technology* 1(8) August 2013.
- [35] K. shaque, Z.Salam, “A Review of Maximum Power Point Tracking Techniques of PV System for Uniform Insolation and Partial Shading Condition,” *Renewable and Sustainable Energy Reviews*19 (2013) 475.
- [36] S. Lyden, M.E. Haque, “Maximum Power Point Tracking techniques for photovoltaic systems: A comprehensive review and comparative analysis,” *Renewable and Sustainable Energy Reviews* 52 (2015) 1504–1518.
- [37] M. Aureliano, G. de Brito, L. Galotto, Jr., L. P. Sampaio, G. de Azevedo e Melo, and C.A. Canesin, “Evaluation of the Main MPPT Techniques for Photovoltaic Applications” *IEEE Trans. Ind. Electron.*, vol. 58, no. 1, pp. 66-75, Jan. 2011.
- [38] D. Sera, R. Teodorescu, J. Hantschel, and M. Knoll, “Optimized Maximum Power Point Tracker for Fast-Changing Environmental Conditions” *IEEE Trans. Ind. Electron.*, vol. 55, no. 7, pp. 2629-2637, July. 2008.

- [39] K.H. Hussein, I. Muta, I. Hoshino, M. Osakada, "Maximum photovoltaic power tracking : an algorithm for rapidly changing atmospheric conditions" IEE Proceedings Generation, Transmission and Distribution Year: 1995, Volume: 142, Issue: 1 Pages: 59 – 64.
- [40] F. Liu, S. Duan, F. Liu, B. Liu, Y. Kang, "A Variable Step Size INC MPPT Method for PV Systems" IEEE Trans. Ind. Electron., vol. 55, no. 7, pp. 2622-2628, July. 2008.
- [41] Q. Mei, M. Shan; L. Liu, J.M. Guerrero, "A Novel Improved Variable Step-Size Incremental-Resistance MPPT Method for PV Systems" IEEE Trans. Ind. Electron., vol. 58, no. 6, pp. 2427-2434, June. 2011.
- [42] P. Midya; P. T. Krein; R. J. Turnbull; R. Reppa; J. Kimball, "Dynamic Maximum Power Point Tracker for Photovoltaic Applications," PESC Record. 27th Annual IEEE Power Electronics Specialists Conference Year: 1996, Volume: 2, Pages: 1710 - 1716 vol.2.
- [43] A. Costabeber; M. Carraro; M. Z. Guerrero, "Convergence Analysis and Tuning of a Sliding-Mode Ripple-Correlation MPPT IEEE Transactions on Energy Conversion Year: 2015, Volume: 30, Issue: 2 Pages: 696 – 706.
- [44] Samerchur, S.; Premrudeepreechacharn, S.; Kumsuwun, Y.; Higuchi, K., "Power Control of Single-phase Voltage Source Inverter for Grid-connected Photovoltaic Systems," in Proc. Power Systems Conference and Exposition (PSCE), 2011, pp. 1-6.
- [45] R. González, J. López, P. Sanchis, L. Marroyo, "Transformerless Inverter for Single-Phase Photovoltaic Systems," IEEE Trans. Power Electronics., vol. 22, no. 2, pp. 963– 697, March. 2007.
- [46] R. González, J. López, P. Sanchis, L. Marroyo, "Transformerless Single-Phase Multilevel-Based Photovoltaic Inverter," IEEE Trans. Ind. Electron., vol. 55, no. 7, pp. 2694– 2702, July. 2008.

- [47] S. Vazquez, J.I. Leon, J. M. Carrasco, L. G. Franquelo, E. Galvan, M. Reyes, J.A. Sanchez, E. Dominguez, "Analysis of the Power Balance in the Cells of a Multilevel Cascaded H-Bridge Converter," *IEEE Trans. Ind. Electron.*, vol. 57, no. 7, pp. 2694–2702, July. 2010.
- [48] J. Chavarría, D. Biel, F. Guinjoan, C. Meza, J.J. Negroni, "Energy-balance Control of PV Cascaded Multilevel Grid-Connected Inverters Under Level-Shifted and Phase-Shifted PWMs," *IEEE Trans. Ind. Electron.*, vol. 60, no. 1, pp. 98-111, Jan. 2013.
- [49] Y. Yang, F. Blaabjerg and H. Wang, "Low-Voltage Ride-Through of Single-Phase Transformerless Photovoltaic Inverters," *IEEE Trans. Ind. Appl.*, vol. 50, no. 3, pp. 1942-1952, May/Jun. 2014.
- [50] W. Li, Y. Gu, H. Luo, W. Cui, X. He and C. Hia, "Topology Review and Derivation Methodology of Single-phase Transformerless Photovoltaic Inverters for Leakage Current Suppression," *IEEE Trans. Ind. Electron.*, vol. 62, no. 7, pp. 4537-4551, July. 2015.
- [51] R. A. Mastromauro, M. Liserre and A. Dell, "Control Issues in Single-stage Photovoltaic Systems: MPPT Current and Voltage Control," *IEEE Trans. Ind. Infom.*, vol. 8, no. 2, pp. 241-254, May. 2012.
- [52] M. Ebrahimi, S. A. Khajehoddin and M. K. Ghartemani, "Fast and Robust Single-phase DQ Current Controller for Smart Inverter Applications," *IEEE Trans. Power Electron.*, vol. 31, no. 5, pp. 3968-3976, May. 2006.
- [53] J. Lai, "Power Conditioning Circuit Topologies," *IEEE Ind. Electron. Mag.*, pp. 24-34, Jun. 2009.
- [54] D. Meneses, F. Blaabjerg, O. Garcia and J. A. Cobos, "Review and Comparison of Step-up Transformerless Topologies for Photovoltaic AC-Module Application," *IEEE Trans. Power Electron.*, vol. 28, no. 6, pp. 2649-2663, Jun. 2013.

- [55] H. Hu, S. Harb, N. Kutkut, I. Batarseh and Z. J. Shen, "A Review of Power Decoupling Techniques for Microinverters With Three Different Decoupling Capacitor Locations in PV Systems," *IEEE Trans. Power Electron.*, vol. 28, no. 6, pp. 2711-2726, Jun. 2013.
- [56] Y. H. Kim, Y. H. Ji, J. G. Kim, Y. C. Jung and C. Y. Won, "A New Control Strategy for Improving Weighted Efficiency in Photovoltaic AC Module-Type Interleaved Flyback Inverters," *IEEE Trans. Power Electron.*, vol. 28, no. 6, pp. 2688-2699, Jun. 2013.
- [57] S. A. Arshadi, B. Poorali, E. Adib and H. Farzanehfard, "High Step-up DC-AC Inverter Suitable for AC module Applications," *IEEE Trans. Ind. Electron.*, vol. 63, no. 2, pp. 832-839, Feb. 2016.
- [58] N. A. Rahim, K. Chaniago and J. Selvaraj, "Single-phase Seven-level Grid-Connected Inverter for Photovoltaic System," *IEEE Trans. Ind. Electron.*, vol. 58, no. 6, pp. 2435-2443, Jun. 2011.
- [59] J.-S. Choi and F.-S. Kang, "Seven-level PWM Inverter Employing Series-Connected Capacitors Paralleled to a Single DC Voltage Source," *IEEE Trans. Ind. Electron.*, vol. 62, no. 6, pp. 3448-3459, Jun. 2015.
- [60] T. F. Wu, C. H. Chang, L. C. Lin and C. L. Kuo, "Power Loss Comparison of Single- and Two-stage Grid-connected Photovoltaic Systems," *IEEE Trans. Energy convers.*, vol. 26, no. 2, pp. 707-715, Jun. 2011.
- [61] M. A. G. de Brito, L. Galotto, Jr., L. P. Sampaio, G. de A. e Melo and C. A. Canesin, "Evaluation of the Main MPPT Techniques for Photovoltaic Applications," *IEEE Trans. Ind. Electron.*, vol. 60, no. 3, pp. 1156-1167, Mar. 2013.
- [62] N. Femia, G. Petrone, G. Spagnuolo and M. Vitelli, "A Technique for Improving P&O MPPT Performances of Double-stage Grid-connected

- Photovoltaic Systems,” IEEE Trans. Ind. Electron., vol. 56, no. 11, pp. 4473-4482, Nov. 2009.
- [63] D. G. Montoya, C. A. R.-Paja and R. Giral, “Improved Design of Sliding-Mode Controllers Based on the Requirement of MPPT Techniques,” IEEE Trans. Power Electron., vol. 31, no. 1, pp. 234-247, Jan. 2016.
- [64] C. Barth and R. C. N. P.-Podgurski, “Dithering Digital Ripple Correlation Control for Photovoltaic Maximum Power Point Tracking,” IEEE Trans. Power Electron., vol. 30, no. 8, pp. 4548-4559, Aug. 2015.
- [65] S. L. Brunton, C. W. Rowley, S. R. Kulka and C. Clarkson, “Maximum Power Point Tracking for Photovoltaic Optimization Using Ripple-based Extremum Seeking Control,” IEEE Trans. Power Electron., vol. 25, no. 10, pp. 2531-2540, Oct. 2010.
- [66] A. M. Bazzi and P. T. Krein, “Ripple Correlation Control: an Extremum Seeking Control Perspective for Real-time Optimization,” IEEE Trans. Power Electron., vol. 29, no. 02, pp. 988-995, Feb. 2014.
- [67] R. Khanna, Q. Zhang, W. E. Stanchina, G. F. Reed and Z.-H. Mao, “Maximum Power Point Tracking Using Model Reference Adaptive Control,” IEEE Trans. Power Electron., vol. 29, no. 3, pp. 1490-1499, Mar. 2014.
- [68] S. Golestan, M. Ramezani, J. M. Guerrero, F. D. Freijedo, and M. Monfared, “Moving Average Filter Based Phase-locked Loops: Performance Analysis and Design Guidelines,” IEEE Trans. Power Electron., vol. 29, no. 6, pp. 2750–2763, Jun. 2014.
- [69] C. Boonmee, Y. Kumsuwan, “Modified Maximum Power Point Tracking Based-on Ripple Correlation Control Application for Single-phase VSI Grid-connected PV systems,” in Proc. IEEE Conf., ECTI-CON2013, pp.1-6.

- [70] C. Boonmee, Y. Kumsuwan, "Control of Single-phase Cascaded H-bridge Multilevel Inverter with Modified MPPT for Grid-connected Photovoltaic Systems," in Proc. IEEE Conf., IECON 2013, pp. 566 - 571.
- [71] C. Boonmee, Y. Kumsuwan, "A Phase-shifted Carrier-Based PWM Technique for Cascaded H-bridge Inverters Application in Standalone PV System," in Proc. IEEE Conf. ,EPE-PEMC 2012, pp. LS8c.3-1-4.



ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่
Copyright© by Chiang Mai University
All rights reserved