

References

- (2011 [Available online: www.cde.com/resources/catalogs/AEappGUIDE.pdf]), "Aluminum electrolytic capacitor application guide", 2011 [Available online: www.cde.com/resources/catalogs/AEappGUIDE.pdf]
- (2013), "IEEE Draft Recommended Practices and Requirements for Harmonic Control in Electric Power Systems", *IEEE P519/D6ba*, September 2013, pp. 1–26 Nov 2013
- Abeywardana, D. B. W., Hredzak, B., and Agelidis, V. G. (2016a), "An Input Current Feedback Method to Mitigate the DC-Side Low-Frequency Ripple Current in a Single-Phase Boost Inverter", *IEEE Transactions on Power Electronics*, Vol. 31, No. 6, pp. 4594–4603 June 2016a
- Abeywardana, D. B. W., Hredzak, B., and Agelidis, V. G. (2016b), "A Rule-Based Controller to Mitigate DC-Side Second-Order Harmonic Current in a Single-Phase Boost Inverter", *IEEE Transactions on Power Electronics*, Vol. 31, No. 2, pp. 1665–1679 Feb 2016b
- Ahmad, A. A., Abrishamifar, A., and Samadi, S. (2012), "Low-frequency current ripple reduction in front-end boost converter with single-phase inverter load", *IET Power Electronics*, Vol. 5, No. 9, pp. 1676–1683 November 2012
- Aldaheri, A. and Etemadi, A. (2017), "Impedance Decoupling in DC Distributed Systems to Maintain Stability and Dynamic Performance", *Energies*, Vol. 10, No. 4, p. 470 April 2017
- Almeida, P., Bender, V., Braga, H., Dalla Costa, M., Marchesan, T., and Alonso, J. (2015), "Static and Dynamic Photoelectrothermal Modeling of LED Lamps Including Low-Frequency Current Ripple Effects", *IEEE Transactions on Power Electronics*, Vol. 30, No. 7, pp. 3841–3851 July 2015
- Araujo, S. V., Zacharias, P., and Mallwitz, R. (2010), "Highly Efficient Single-Phase Transformerless Inverters for Grid-Connected Photovoltaic Systems", *IEEE Transactions on Industrial Electronics*, Vol. 57, No. 9, pp. 3118–3128 Sept 2010
- Arias, M., Diaz, M. F., Lamar, D. G., Balocco, D., Diallo, A. A., and Sebastián, J. (2013), "High-Efficiency Asymmetrical Half-Bridge Converter Without Electrolytic Capacitor for Low-Output-Voltage AC-DC LED Drivers", *IEEE Transactions on Power Electronics*, Vol. 28, No. 5, pp. 2539–2550 May 2013
- Bandyopadhyay, B., Deepak, F., and Kim, K.-S., *Sliding Mode Control Using Novel Sliding Surfaces*, Springer Science & Business Media 2009
- Bartolini, G., Ferrara, A., Usai, E., and Utkin, V. I. (2000), "On multi-input chattering-free second-order sliding mode control", *IEEE Transactions on Automatic Control*, Vol. 45, No. 9, pp. 1711–1717 Sept 2000
- Bhowmick, S. and Umanand, L. (2018), "Design and Analysis of the Low Device Stress Active Power Decoupling for Single Phase Grid Connection for a Wide Range of Power Factor", *IEEE Journal of Emerging and Selected Topics in Power Electronics*, pp. 1–1 2018
- Blaabjerg, F., Teodorescu, R., Liserre, M., and Timbus, A. V. (2006), "Overview of Control and Grid Synchronization for Distributed Power Generation Systems", *IEEE Transactions on Industrial Electronics*, Vol. 53, No. 5, pp. 1398–1409 Oct 2006
- Bojoi, R., Pica, C., Ruiu, D., and Tenconi, A. (2010), "New DC-DC converter with reduced low-frequency current ripple for Fuel Cell in Single-Phase Distributed Generation", in *2010 IEEE International Conference on Industrial Technology*, pp. 1213–1218 March 2010
- Bramouille, M. (1998), "Electrolytic or film capacitors?", in *Conference Record of 1998 IEEE Industry Applications Conference. Thirty-Third IAS Annual Meeting (Cat. No.98CH36242)*, Vol. 2, pp. 1138–1141 vol.2 Oct 1998
- Caceres, R. O. and Barbi, I. (1999), "A boost DC-AC converter: analysis, design, and experimenta-

- tion", *IEEE Transactions on Power Electronics*, Vol. 14, No. 1, pp. 134–141 Jan 1999
- Cai, W., Liu, B., Duan, S., and Jiang, L. (2014), "An Active Low-Frequency Ripple Control Method Based on the Virtual Capacitor Concept for BIPV Systems", *IEEE Transactions on Power Electronics*, Vol. 29, No. 4, pp. 1733–1745 April 2014
- Cao, D. and Peng, F. Z. (2009), "A Family of Z-source and Quasi-Z-source DC-DC Converters", in *2009 Twenty-Fourth Annual IEEE Applied Power Electronics Conference and Exposition*, pp. 1097–1101 Feb 2009
- Castanos, F. and Fridman, L. (2006), "Analysis and design of integral sliding manifolds for systems with unmatched perturbations", *IEEE Transactions on Automatic Control*, Vol. 51, No. 5, pp. 853–858 May 2006
- Chen, F., Burgos, R., Boroyevich, D., and Dong, D. (2014), "Control loop design of a two-stage bidirectional AC/DC converter for renewable energy systems", in *2014 IEEE Applied Power Electronics Conference and Exposition - APEC 2014*, pp. 2177–2183 March 2014
- Chen, R., Liu, Y., and Peng, F. Z. (2015), "DC Capacitor-Less Inverter for Single-Phase Power Conversion With Minimum Voltage and Current Stress", *IEEE Transactions on Power Electronics*, Vol. 30, No. 10, pp. 5499–5507 Oct 2015
- Chiang, H. C., Lin, F. J., Chang, J. K., Chen, K. F., Chen, Y. L., and Liu, K. C. (2016), "Control method for improving the response of single-phase continuous conduction mode boost power factor correction converter", *IET Power Electronics*, Vol. 9, No. 9, pp. 1792–1800 2016
- Christidis, G. C., Kyritsis, A. C., Papanikolaou, N. P., and Tatakis, E. C. (2016), "Investigation of Parallel Active Filters; Limitations for Power Decoupling on Single-Stage/Single-Phase Microinverters", *IEEE Journal of Emerging and Selected Topics in Power Electronics*, Vol. 4, No. 3, pp. 1096–1106 Sept 2016
- Chub, A., Liivik, L., Zakis, J., and Vinnikon, D. (2015), "Improved switched-inductor quasi-switched-boost inverter with low input current ripple", in *2015 56th International Scientific Conference on Power and Electrical Engineering of Riga Technical University (RTUCON)*, pp. 1–6 Oct 2015
- Chub, A., Vinnikov, D., Blaabjerg, F., and Peng, F. Z. (2016), "A Review of Galvanically Isolated Impedance-Source DC-DC Converters", *IEEE Transactions on Power Electronics*, Vol. 31, No. 4, pp. 2808–2828 April 2016
- D, M. R. (1976), "Input filter considerations in design and application of switching regulators", in *IEEE Conf Rec Annu Meet Ind Appl Soc*, Vol. 11, pp. 366–382 1976
- Duan, Y. and Jin, H. (1999), "Digital controller design for switchmode power converters", in *APEC '99. Fourteenth Annual Applied Power Electronics Conference and Exposition. 1999 Conference Proceedings (Cat. No.99CH36285)*, Vol. 2, pp. 967–973 vol.2 March 1999
- Dunlop, E. D., Halton, D., and Ossenbrink, H. A. (2005), "20 years of life and more: where is the end of life of a PV module?", in *Conference Record of the Thirty-first IEEE Photovoltaic Specialists Conference, 2005.*, pp. 1593–1596 Jan 2005
- Edwards, C. and Spurgeon, S., *Sliding Mode Control: Theory and Applications*, CRC Press 1998
- EG and Inc, G. T. S., *Fuel Cell Handbook (Seventh Edition)*, Lulu.com 2016
- Ellabban, O. and Abu-Rub, H. (2016), "Z-Source Inverter: Topology Improvements Review", *IEEE Industrial Electronics Magazine*, Vol. 10, No. 1, pp. 6–24 March 2016
- Fan, S., Xue, Y., and Zhang, K. (2012), "A novel active power decoupling method for single-phase photovoltaic or energy storage applications", in *2012 IEEE Energy Conversion Congress and Exposition (ECCE)*, pp. 2439–2446 Sept 2012
- Fang, P., Liu, Y., and Sen, P. C. (2015), "A Flicker-Free Single-Stage Offline LED Driver With High Power Factor", *IEEE Journal of Emerging and Selected Topics in Power Electronics*, Vol. 3, No. 3, pp. 654–665 Sept 2015
- Ferreira, R. V., Silva, S. M., Brandao, D. I., and Antunes, H. M. A. (2016), "Single-phase synchronous converter for residential PV power systems", in *2016 17th International Conference on Harmonics and Quality of Power (ICHQP)*, pp. 861–866 Oct 2016
- Franquelo, L. G., Rodriguez, J., Leon, J. I., Kouro, S., Portillo, R., and Prats, M. A. M. (2008), "The

- age of multilevel converters arrives”, *IEEE Industrial Electronics Magazine*, Vol. 2, No. 2, pp. 28–39 June 2008
- Fukushima, K., Norigoe, I., Shoyama, M., Ninomiya, T., Harada, Y., and Tsukakoshi, K. (2009), “Input Current-Ripple Consideration for the Pulse-link DC-AC Converter for Fuel Cells by Small Series LC Circuit”, in *2009 Twenty-Fourth Annual IEEE Applied Power Electronics Conference and Exposition*, pp. 447–451 Feb 2009
- Galvez, J. M. and Ordóñez, M. (2015), “Swinging Bus Operation of Inverters for Fuel Cell Applications With Small DC-Link Capacitance”, *IEEE Transactions on Power Electronics*, Vol. 30, No. 2, pp. 1064–1075 Feb 2015
- Gautam, A. R., Gourav, K., Guerrero, J. M., and Fulwani, D. M. (2018), “Ripple Mitigation With Improved Line-Load Transients Response in a Two-Stage DC-DC-AC Converter: Adaptive SMC Approach”, *IEEE Transactions on Industrial Electronics*, Vol. 65, No. 4, pp. 3125–3135 April 2018
- Ge, B., Liu, Y., Abu-Rub, H., Balog, R. S., Peng, F. Z., McConnell, S., and Li, X. (2016a), “Current Ripple Damping Control to Minimize Impedance Network for Single-Phase Quasi-Z Source Inverter System”, *IEEE Transactions on Industrial Informatics*, Vol. 12, No. 3, pp. 1043–1054 June 2016a
- Ge, B., Liu, Y., Abu-Rub, H., Balog, R. S., Peng, F. Z., Sun, H., and Li, X. (2016b), “An Active Filter Method to Eliminate DC-Side Low-Frequency Power for a Single-Phase Quasi-Z-Source Inverter”, *IEEE Transactions on Industrial Electronics*, Vol. 63, No. 8, pp. 4838–4848 Aug 2016b
- Ge, B., Li, X., Zhang, H., Liu, Y., Balog, R. S., Abu-Rub, H., and Alpuerto, L. (2018), “Direct Instantaneous Ripple Power Predictive Control for Active Ripple Decoupling of Single-Phase Inverter”, *IEEE Transactions on Industrial Electronics*, Vol. 65, No. 4, pp. 3165–3175 April 2018
- Gu, B., Dominic, J., Zhang, J., Zhang, L., Chen, B., and Lai, J. S. (2014), “Control of electrolyte-free microinverter with improved MPPT performance and grid current quality”, in *2014 IEEE Applied Power Electronics Conference and Exposition - APEC 2014*, pp. 1788–1792 March 2014
- Harb, S., Mirjafari, M., and Balog, R. S. (2013), “Ripple-Port Module-Integrated Inverter for Grid-Connected PV Applications”, *IEEE Transactions on Industry Applications*, Vol. 49, No. 6, pp. 2692–2698 Nov 2013
- He, J., Li, Y. W., and Blaabjerg, F. (2014), “Flexible Microgrid Power Quality Enhancement Using Adaptive Hybrid Voltage and Current Controller”, *IEEE Transactions on Industrial Electronics*, Vol. 61, No. 6, pp. 2784–2794 June 2014
- Hu, H., Harb, S., Kutkut, N., Batarseh, I., and Shen, Z. J. (2010), “Power decoupling techniques for micro-inverters in PV systems-a review”, in *2010 IEEE Energy Conversion Congress and Exposition*, pp. 3235–3240 Sept 2010
- Hu, S. and Li, X. (2017), “Performance Evaluation of a Semi-Dual-Bridge Resonant DC/DC Converter With Secondary Phase-Shifted Control”, *IEEE Transactions on Power Electronics*, Vol. 32, No. 10, pp. 7727–7738 Oct 2017
- Hu, Y., Du, Y., Xiao, W., Finney, S., and Cao, W. (2015), “DC-link voltage control strategy for reducing capacitance and total harmonic distortion in single-phase grid-connected photovoltaic inverters”, *IET Power Electronics*, Vol. 8, No. 8, pp. 1386–1393 2015
- Huang, K. P., Wang, Y., and Wai, R. J. (2018), “Design of Power Decoupling Strategy for Single-Phase Grid-Connected Inverter Under Non-Ideal Power Grid”, *IEEE Transactions on Power Electronics*, pp. 1–1 2018
- Hung, J. Y., Gao, W., and Hung, J. C. (1993), “Variable structure control: a survey”, *IEEE Transactions on Industrial Electronics*, Vol. 40, No. 1, pp. 2–22 Feb 1993
- i. Itoh, J. and Hayashi, F. (2010), “Ripple Current Reduction of a Fuel Cell for a Single-Phase Isolated Converter Using a DC Active Filter With a Center Tap”, *IEEE Transactions on Power Electronics*, Vol. 25, No. 3, pp. 550–556 March 2010
- i. Itoh, J., Sakuraba, T., Kusaka, K., Watanabe, H., and Furukawa, K. (2016), “Comparison of circuit topologies for active power decoupling toward high power density”, in *2016 IEEE 8th International Power Electronics and Motion Control Conference (IPEMC-ECCE Asia)*, pp. 421–428 May 2016

- Irfan, M. S., Ahmed, A., and Park, J. H. (2018), "Power-Decoupling of a Multiport Isolated Converter for an Electrolytic-Capacitorless Multilevel Inverter", *IEEE Transactions on Power Electronics*, Vol. 33, No. 8, pp. 6656–6671 Aug 2018
- Iyer, V. M. and John, V. (2015), "Low-frequency dc bus ripple cancellation in single phase pulse-width modulation inverters", *IET Power Electronics*, Vol. 8, No. 4, pp. 497–506 2015
- Jamatia, A., Gautam, V., and Sensarma, P. (2016a), "Power decoupling method for single phase PV system using Cuk derived micro-inverter", in *2016 IEEE Energy Conversion Congress and Exposition (ECCE)*, pp. 1–7 Sept 2016a
- Jamatia, A., Gautam, V., and Sensarma, P. (2016b), "Single Phase buck-boost derived PV micro-inverter with power decoupling capability", in *2016 IEEE International Conference on Power Electronics, Drives and Energy Systems (PEDES)*, pp. 1–6 Dec 2016b
- Jang, M. and Agelidis, V. G. (2010), "A minimum power-processing stage fuel cell energy system based on a boost-inverter with a bi-directional back-up battery storage", in *2010 Twenty-Fifth Annual IEEE Applied Power Electronics Conference and Exposition (APEC)*, pp. 295–302 Feb 2010
- Jang, S. J., Won, C. Y., Lee, B. K., and Hur, J. (2007), "Fuel Cell Generation System With a New Active Clamping Current-Fed Half-Bridge Converter", *IEEE Transactions on Energy Conversion*, Vol. 22, No. 2, pp. 332–340 June 2007
- Jung, H. J., Ha, K. S., Song, B. M., Lai, J. S., Hyun, D. S., and Kim, R. Y. (2011), "Low frequency current reduction using a quasi-notch filter operated in two-stage DC-DC-AC grid-connected systems", in *2011 IEEE Energy Conversion Congress and Exposition*, pp. 2746–2750 Sept 2011
- Khajehoddin, S. A., Karimi-Ghartemani, M., Jain, P. K., and Bakhshai, A. (2013), "DC-Bus Design and Control for a Single-Phase Grid-Connected Renewable Converter With a Small Energy Storage Component", *IEEE Transactions on Power Electronics*, Vol. 28, No. 7, pp. 3245–3254 July 2013
- Kjaer, S. B., Pedersen, J. K., and Blaabjerg, F. (2005), "A review of single-phase grid-connected inverters for photovoltaic modules", *IEEE Transactions on Industry Applications*, Vol. 41, No. 5, pp. 1292–1306 Sept 2005
- Kong, Z., Huang, X., Wang, Z., Xiong, J., and Zhang, K. (2018), "Active Power Decoupling for Submodules of a Modular Multilevel Converter", *IEEE Transactions on Power Electronics*, Vol. 33, No. 1, pp. 125–136 Jan 2018
- Krein, P. T., Balog, R. S., and Mirjafari, M. (2012), "Minimum Energy and Capacitance Requirements for Single-Phase Inverters and Rectifiers Using a Ripple Port", *IEEE Transactions on Power Electronics*, Vol. 27, No. 11, pp. 4690–4698 Nov 2012
- Ksiazek, P. F. and Ordonez, M. (2014), "Swinging Bus Technique for Ripple Current Elimination in Fuel Cell Power Conversion", *IEEE Transactions on Power Electronics*, Vol. 29, No. 1, pp. 170–178 Jan 2014
- Kwon, J. M., Kim, E. H., Kwon, B. H., and Nam, K. H. (2009), "High-Efficiency Fuel Cell Power Conditioning System With Input Current Ripple Reduction", *IEEE Transactions on Industrial Electronics*, Vol. 56, No. 3, pp. 826–834 March 2009
- Kyritsis, A. C., Papanikolaou, N. P., Tatakis, E. C., and Kobougiias, J. C. (2005), "Design and control of a current source flyback inverter for decentralized grid-connected photovoltaic systems", in *2005 European Conference on Power Electronics and Applications*, pp. 10 pp.–P.10 Sept 2005
- Kyritsis, A. C., Papanikolaou, N. P., and Tatakis, E. C. (2007), "A novel Parallel Active Filter for Current Pulsation Smoothing on single stage grid-connected AC-PV modules", in *2007 European Conference on Power Electronics and Applications*, pp. 1–10 Sept 2007
- Lai, J. S. and Ellis, M. W. (2017), "Fuel Cell Power Systems and Applications", *Proceedings of the IEEE*, Vol. 105, No. 11, pp. 2166–2190 Nov 2017
- Li, H., Zhang, K., Zhao, H., Fan, S., and Xiong, J. (2013), "Active Power Decoupling for High-Power Single-Phase PWM Rectifiers", *IEEE Transactions on Power Electronics*, Vol. 28, No. 3, pp. 1308–1319 March 2013
- Li, Q. and Wolfs, P. (2008a), "A Review of the Single Phase Photovoltaic Module Integrated Converter Topologies With Three Different DC Link Configurations", *IEEE Transactions on Power*

- Electronics*, Vol. 23, No. 3, pp. 1320–1333 May 2008a
- Li, Q. and Wolfs, P. (2008b), “A Review of the Single Phase Photovoltaic Module Integrated Converter Topologies With Three Different DC Link Configurations”, *IEEE Transactions on Power Electronics*, Vol. 23, No. 3, pp. 1320–1333 May 2008b
- Liang, W., Liu, Y., Ge, B., Abu-Rub, H., Balog, R. S., and Xue, Y. (2018), “Double-Line-Frequency Ripple Model, Analysis, and Impedance Design for Energy-Stored Single-Phase Quasi-Z-Source Photovoltaic System”, *IEEE Transactions on Industrial Electronics*, Vol. 65, No. 4, pp. 3198–3209 April 2018
- Liserre, M., Pigazo, A., Dell’Aquila, A., and Moreno, V. M. (2006), “An Anti-Islanding Method for Single-Phase Inverters Based on a Grid Voltage Sensorless Control”, *IEEE Transactions on Industrial Electronics*, Vol. 53, No. 5, pp. 1418–1426 Oct 2006
- Liu, B., Wang, L., Song, D., Su, M., Yang, J., He, D., Chen, Z., and Song, S. (2018), “Control of Single-phase Grid-connected Photovoltaic Inverter under Battery Input Condition in Residential Photovoltaic/Battery Systems”, *IEEE Transactions on Sustainable Energy*, pp. 1–1 2018
- Liu, C. and Lai, J. S. (2007a), “Low Frequency Current Ripple Reduction Technique With Active Control in a Fuel Cell Power System With Inverter Load”, *IEEE Transactions on Power Electronics*, Vol. 22, No. 4, pp. 1429–1436 July 2007a
- Liu, C. and Lai, J.-S. (2007b), “Low Frequency Current Ripple Reduction Technique With Active Control in a Fuel Cell Power System With Inverter Load”, *IEEE Transactions on Power Electronics*, Vol. 22, No. 4, pp. 1429–1436 July 2007b
- Liu, W., Wang, K., h. Chung, H. S., and h. Chuang, S. T. (2015), “Modeling and Design of Series Voltage Compensator for Reduction of DC-Link Capacitance in Grid-Tie Solar Inverter”, *IEEE Transactions on Power Electronics*, Vol. 30, No. 5, pp. 2534–2548 May 2015
- Liu, X., Wang, P., Loh, P. C., Blaabjerg, F., and Xue, M. (2011), “Six switches solution for single-phase AC/DC/AC converter with capability of second-order power mitigation in DC-link capacitor”, in *2011 IEEE Energy Conversion Congress and Exposition*, pp. 1368–1375 Sept 2011
- Liu, X., Li, H., and Wang, Z. (2014), “A Fuel Cell Power Conditioning System With Low-Frequency Ripple-Free Input Current Using a Control-Oriented Power Pulsation Decoupling Strategy”, *IEEE Transactions on Power Electronics*, Vol. 29, No. 1, pp. 159–169 Jan 2014
- Liu, Y., Ge, B., Abu-Rub, H., Sun, H., Peng, F. Z., and Xue, Y. (2016), “Model Predictive Direct Power Control for Active Power Decoupled Single-Phase Quasi-Z -Source Inverter”, *IEEE Transactions on Industrial Informatics*, Vol. 12, No. 4, pp. 1550–1559 Aug 2016
- Liu, Y., Ge, B., and Abu-Rub, H. (2017), “A model predictive control for low-frequency ripple power elimination of active power filter integrated single-phase quasi-Z-source inverter”, in *2017 IEEE International Conference on Industrial Technology (ICIT)*, pp. 1540–1545 March 2017
- Loukianov, A. G., Espinosa-Guerra, O., Castillo-Toledo, B., and Utkin, V. A. (2006), “Integral Sliding Mode Control for Systems with Time Delay”, in *International Workshop on Variable Structure Systems, 2006. VSS’06.*, pp. 256–261 June 2006
- Lu, D. D. (2017), “Comparison of DC/DC converters in DCM for reducing low-frequency input current ripple of single-phase two-stage inverters”, in *2017 20th International Conference on Electrical Machines and Systems (ICEMS)*, pp. 1–4 Aug 2017
- Lyu, X., Li, Y., and Cao, D. (2015), “A high power density single-phase inverter with in-series and -parallel power decoupling method”, in *2015 IEEE Energy Conversion Congress and Exposition (ECCE)*, pp. 2549–2554 Sept 2015
- Lyu, X., Ren, N., Li, Y., and Cao, D. (2016), “A SiC-Based High Power Density Single-Phase Inverter With In-Series and In-Parallel Power Decoupling Method”, *IEEE Journal of Emerging and Selected Topics in Power Electronics*, Vol. 4, No. 3, pp. 893–901 Sept 2016
- Makovenko, E., Husev, O., Zakis, J., Roncero-Clemente, C., Romero-Cadaval, E., and Vinnikov, D. (2017), “Passive power decoupling approach for three-level single-phase impedance Source Inverter based on resonant and PID controllers”, in *2017 11th IEEE International Conference on Compatibility, Power Electronics and Power Engineering (CPE-POWERENG)*, pp. 516–521 April 2017

- Mazumder, S. K., Burra, R. K., and Acharya, K. (2007), "A Ripple-Mitigating and Energy-Efficient Fuel Cell Power-Conditioning System", *IEEE Transactions on Power Electronics*, Vol. 22, No. 4, pp. 1437–1452 July 2007
- Mellincovsky, M., Yuhimenko, V., Peretz, M. M., and Kuperman, A. (2017a), "Low-Frequency DC-Link Ripple Elimination in Power Converters With Reduced Capacitance by Multiresonant Direct Voltage Regulation", *IEEE Transactions on Industrial Electronics*, Vol. 64, No. 3, pp. 2015–2023 March 2017a
- Mellincovsky, M., Yuhimenko, V., Peretz, M. M., and Kuperman, A. (2017b), "Low-Frequency DC-Link Ripple Elimination in Power Converters With Reduced Capacitance by Multiresonant Direct Voltage Regulation", *IEEE Transactions on Industrial Electronics*, Vol. 64, No. 3, pp. 2015–2023 March 2017b
- Mellincovsky, M., Yuhimenko, V., Zhong, Q. C., Peretz, M. M., and Kuperman, A. (2018), "Active DC Link Capacitance Reduction in Grid-Connected Power Conversion Systems by Direct Voltage Regulation", *IEEE Access*, Vol. 6, pp. 18163–18173 2018
- Mitwalli, A. H., Leeb, S. B., Verghese, G. C., and Thottuvelil, V. J. (1996), "An adaptive digital controller for a unity power factor converter", *IEEE Transactions on Power Electronics*, Vol. 11, No. 2, pp. 374–382 Mar 1996
- Morsy, A. S. and Enjeti, P. N. (2016), "Comparison of Active Power Decoupling Methods for High-Power-Density Single-Phase Inverters Using Wide-Bandgap FETs for Google Little Box Challenge", *IEEE Journal of Emerging and Selected Topics in Power Electronics*, Vol. 4, No. 3, pp. 790–798 Sept 2016
- Nguyen, M. and Choi, Y. (2018), "PWM Control Scheme For Quasi-Switched-Boost Inverter to Improve Modulation Index", *IEEE Transactions on Power Electronics*, Vol. 33, No. 5, pp. 4037–4044 May 2018
- Nguyen, M. K. and Tran, T. T. (2018), "A Single-Phase Single-Stage Switched-Boost Inverter With Four Switches", *IEEE Transactions on Power Electronics*, Vol. 33, No. 8, pp. 6769–6781 Aug 2018
- Nguyen, M. K., Lim, Y. C., and Cho, G. B. (2011), "Switched-Inductor Quasi-Z-Source Inverter", *IEEE Transactions on Power Electronics*, Vol. 26, No. 11, pp. 3183–3191 Nov 2011
- Nguyen, M. K., Le, T. V., Park, S. J., and Lim, Y. C. (2015), "A Class of Quasi-Switched Boost Inverters", *IEEE Transactions on Industrial Electronics*, Vol. 62, No. 3, pp. 1526–1536 March 2015
- Nguyen, M. K., Duong, T. D., Lim, Y. C., and Choi, J. H. (2018a), "High Voltage Gain Quasi-Switched Boost Inverters with Low Input Current Ripple", *IEEE Transactions on Industrial Informatics*, pp. 1–1 2018a
- Nguyen, M. K., Tran, T. T., and Lim, Y. C. (2018b), "A Family of PWM Control Strategies for Single-Phase Quasi-Switched-Boost Inverter", *IEEE Transactions on Power Electronics*, pp. 1–1 2018b
- Ohnuma, Y., Orikawa, K., and Itoh, J. (2015), "A Single-Phase Current-Source PV Inverter With Power Decoupling Capability Using an Active Buffer", *IEEE Transactions on Industry Applications*, Vol. 51, No. 1, pp. 531–538 Jan 2015
- Parker, T. P. (2011, [Online pdf available]), "Reliability in PV inverter design: black art or science-based discipline?", *Solarbridge Technologies white paper* May 2011, [Online pdf available]
- Peng, F. Z. (2003), "Z-source inverter", *IEEE Transactions on Industry Applications*, Vol. 39, No. 2, pp. 504–510 Mar 2003
- Peng, F. Z., Shen, M., and Qian, Z. (2005), "Maximum boost control of the Z-source inverter", *IEEE Transactions on Power Electronics*, Vol. 20, No. 4, pp. 833–838 July 2005
- Petrone, G., Spagnuolo, G., Teodorescu, R., Veerachary, M., and Vitelli, M. (2008), "Reliability Issues in Photovoltaic Power Processing Systems", *IEEE Transactions on Industrial Electronics*, Vol. 55, No. 7, pp. 2569–2580 July 2008
- Prodic, A., Chen, J., Maksimovic, D., and Erickson, R. W. (2003), "Self-tuning digitally controlled low-harmonic rectifier having fast dynamic response", *IEEE Transactions on Power Electronics*, Vol. 18, No. 1, pp. 420–428 Jan 2003
- Qi, W., Wang, H., Tan, X., Wang, G., and Ngo, K. D. T. (2014), "A novel active power decoupling

- single-phase PWM rectifier topology”, in *2014 IEEE Applied Power Electronics Conference and Exposition - APEC 2014*, pp. 89–95 March 2014
- r. Zhu, G., Wang, H., Liang, B., Tan, S. C., and Jiang, J. (2016), “Enhanced Single-Phase Full-Bridge Inverter With Minimal Low-Frequency Current Ripple”, *IEEE Transactions on Industrial Electronics*, Vol. 63, No. 2, pp. 937–943 Feb 2016
- Rahim, N. A. and Selvaraj, J. (2010), “Multistring Five-Level Inverter With Novel PWM Control Scheme for PV Application”, *IEEE Transactions on Industrial Electronics*, Vol. 57, No. 6, pp. 2111–2123 June 2010
- Redl, R. and Sokal, N. O. (1986), “Near-Optimum Dynamic Regulation of DC-DC Converters Using Feed-Forward of Output Current and Input Voltage with Current-Mode Control”, *IEEE Transactions on Power Electronics*, Vol. PE-1, No. 3, pp. 181–192 July 1986
- Rekha, Y., Christopher, I. W., and Jamuna, V. (2017), “Quasi-ZSI topology for renewable energy system: A review”, in *2017 International Conference on Power and Embedded Drive Control (ICPEDC)*, pp. 333–337 March 2017
- Rodriguez, J., Lai, J.-S., and Peng, F. Z. (2002), “Multilevel inverters: a survey of topologies, controls, and applications”, *IEEE Transactions on Industrial Electronics*, Vol. 49, No. 4, pp. 724–738 Aug 2002
- RS, G. (2003), “Analysis for the Effect of Inverter Ripple Current on Fuel Cell Operating Condition”, *ASME. J. Fluids Eng.*, Vol. 125, No. 3, pp. 576–585 2003
- Rubagotti, M., Estrada, A., Castanos, F., Ferrara, A., and Fridman, L. (2011), “Integral Sliding Mode Control for Nonlinear Systems With Matched and Unmatched Perturbations”, *IEEE Transactions on Automatic Control*, Vol. 56, No. 11, pp. 2699–2704 Nov 2011
- Serban, I. (2015), “Power Decoupling Method for Single-Phase H-Bridge Inverters With No Additional Power Electronics”, *IEEE Transactions on Industrial Electronics*, Vol. 62, No. 8, pp. 4805–4813 Aug 2015
- Shen, M., Wang, J., Joseph, A., Peng, F. Z., Tolbert, L. M., and Adams, D. J. (2006), “Constant boost control of the Z-source inverter to minimize current ripple and voltage stress”, *IEEE Transactions on Industry Applications*, Vol. 42, No. 3, pp. 770–778 May 2006
- Shen, Y., Wang, H., Al-Durra, A., Qin, Z., and Blaabjerg, F. (2018), “A Bidirectional Resonant DC-DC Converter Suitable for Wide Voltage Gain Range”, *IEEE Transactions on Power Electronics*, Vol. 33, No. 4, pp. 2957–2975 April 2018
- Shi, Y., Li, R., Xue, Y., and Li, H. (2016a), “High-Frequency-Link-Based Grid-Tied PV System With Small DC-Link Capacitor and Low-Frequency Ripple-Free Maximum Power Point Tracking”, *IEEE Transactions on Power Electronics*, Vol. 31, No. 1, pp. 328–339 Jan 2016a
- Shi, Y., Liu, B., and Duan, S. (2016b), “Low-Frequency Input Current Ripple Reduction Based on Load Current Feedforward in a Two-Stage Single-Phase Inverter”, *IEEE Transactions on Power Electronics*, Vol. 31, No. 11, pp. 7972–7985 Nov 2016b
- Shi, Y., Liu, B., and Duan, S. (2018), “Modelling, control and performance analysis of a single-stage single-phase inverter with reduced low-frequency input current ripple”, *IET Power Electronics*, Vol. 11, No. 6, pp. 1074–1082 2018
- Shimizu, T., Jin, Y., and Kimura, G. (2000), “DC ripple current reduction on a single-phase PWM voltage-source rectifier”, *IEEE Transactions on Industry Applications*, Vol. 36, No. 5, pp. 1419–1429 Sep 2000
- Shimizu, T., Wada, K., and Nakamura, N. (2006), “Flyback-Type Single-Phase Utility Interactive Inverter With Power Pulsation Decoupling on the DC Input for an AC Photovoltaic Module System”, *IEEE Transactions on Power Electronics*, Vol. 21, No. 5, pp. 1264–1272 Sept 2006
- Singh, S. A., Azeez, N. A., and Williamson, S. S. (2016), “Capacitance reduction in a single phase Quasi Z-Source Inverter using a hysteresis current controlled active power filter”, in *2016 IEEE 25th International Symposium on Industrial Electronics (ISIE)*, pp. 805–810 June 2016
- Siwakoti, Y. P., Peng, F. Z., Blaabjerg, F., Loh, P. C., and Town, G. E. (2015), “Impedance-Source Networks for Electric Power Conversion Part I: A Topological Review”, *IEEE Transactions on*

- Power Electronics*, Vol. 30, No. 2, pp. 699–716 Feb 2015
- Steigerwald, R. L. (2001), “Power electronic converter technology”, *Proceedings of the IEEE*, Vol. 89, No. 6, pp. 890–897 Jun 2001
- Stevens, J. L., Shaffer, J. S., and Vandenham, J. T. (2002), “The service life of large aluminum electrolytic capacitors: effects of construction and application”, *IEEE Transactions on Industry Applications*, Vol. 38, No. 5, pp. 1441–1446 Sep 2002
- Sullivan, C. R., Awerbuch, J. J., and Latham, A. M. (2013), “Decrease in Photovoltaic Power Output from Ripple: Simple General Calculation and the Effect of Partial Shading”, *IEEE Transactions on Power Electronics*, Vol. 28, No. 2, pp. 740–747 Feb 2013
- Sun, Y., Liu, Y., Su, M., Xiong, W., and Yang, J. (2016), “Review of Active Power Decoupling Topologies in Single-Phase Systems”, *IEEE Transactions on Power Electronics*, Vol. 31, No. 7, pp. 4778–4794 July 2016
- Tang, Y., Blaabjerg, F., Loh, P. C., Jin, C., and Wang, P. (2015a), “Decoupling of Fluctuating Power in Single-Phase Systems Through a Symmetrical Half-Bridge Circuit”, *IEEE Transactions on Power Electronics*, Vol. 30, No. 4, pp. 1855–1865 April 2015a
- Tang, Y., Qin, Z., Blaabjerg, F., and Loh, P. C. (2015b), “A Dual Voltage Control Strategy for Single-Phase PWM Converters With Power Decoupling Function”, *IEEE Transactions on Power Electronics*, Vol. 30, No. 12, pp. 7060–7071 Dec 2015b
- Teodorescu, R., Blaabjerg, F., Liserre, M., and Loh, P. C. (2006), “Proportional-resonant controllers and filters for grid-connected voltage-source converters”, *IEE Proceedings - Electric Power Applications*, Vol. 153, No. 5, pp. 750–762 September 2006
- Tran, T. T. and Nguyen, M. K. (2017), “Cascaded five-level quasi-switched-boost inverter for single-phase grid-connected system”, *IET Power Electronics*, Vol. 10, No. 14, pp. 1896–1903 2017
- Utkin, V. and Shi, J. (1996), “Integral sliding mode in systems operating under uncertainty conditions”, in *Proceedings of 35th IEEE Conference on Decision and Control*, Vol. 4, pp. 4591–4596 vol.4 Dec 1996
- Utkin, V. I., *Sliding modes and their application in variable structure systems*, Mir Publishers 1978
- Veitch, J. A. and McColl, S. L. (1995), “Modulation of fluorescent light: Flicker rate and light source effects on visual performance and visual comfort”, *Lighting Research and Technology*, Vol. 27, No. 4, pp. 243–256 December 1995
- Vitorino, M. A., Alves, L. F. S., Wang, R., and de Rossiter Correa, M. B. (2017), “Low-Frequency Power Decoupling in Single-Phase Applications: A Comprehensive Overview”, *IEEE Transactions on Power Electronics*, Vol. 32, No. 4, pp. 2892–2912 April 2017
- Vlatkovic, V., Sabate, J. A., Ridley, R. B., Lee, F. C., and Cho, B. H. (1992), “Small-signal analysis of the phase-shifted PWM converter”, *IEEE Transactions on Power Electronics*, Vol. 7, No. 1, pp. 128–135 Jan 1992
- Wai, R. J. and Lin, C. Y. (2010), “Active Low-Frequency Ripple Control for Clean-Energy Power-Conditioning Mechanism”, *IEEE Transactions on Industrial Electronics*, Vol. 57, No. 11, pp. 3780–3792 Nov 2010
- Wai, R. J. and Lin, C. Y. (2011), “Dual Active Low-Frequency Ripple Control for Clean-Energy Power-Conditioning Mechanism”, *IEEE Transactions on Industrial Electronics*, Vol. 58, No. 11, pp. 5172–5185 Nov 2011
- Wang, C.-M. (2004), “A novel single-stage full-bridge buck-boost inverter”, *IEEE Transactions on Power Electronics*, Vol. 19, No. 1, pp. 150–159 Jan 2004
- Wang, H. and Blaabjerg, F. (2014), “Reliability of Capacitors for DC-Link Applications in Power Electronic Converters; An Overview”, *IEEE Transactions on Industry Applications*, Vol. 50, No. 5, pp. 3569–3578 Sept 2014
- Wang, H., Chung, H. S. H., and Liu, W. (2014a), “Use of a Series Voltage Compensator for Reduction of the DC-Link Capacitance in a Capacitor-Supported System”, *IEEE Transactions on Power Electronics*, Vol. 29, No. 3, pp. 1163–1175 March 2014a
- Wang, J., Ji, B., Lu, X., Deng, X., Zhang, F., and Gong, C. (2014b), “Steady-State and Dynamic Input

- Current Low-Frequency Ripple Evaluation and Reduction in Two-Stage Single-Phase Inverters With Back Current Gain Model", *IEEE Transactions on Power Electronics*, Vol. 29, No. 8, pp. 4247–4260 Aug 2014b
- Wang, R., Wang, F., Boroyevich, D., Burgos, R., Lai, R., Ning, P., and Rajashekara, K. (2011), "A High Power Density Single-Phase PWM Rectifier With Active Ripple Energy Storage", *IEEE Transactions on Power Electronics*, Vol. 26, No. 5, pp. 1430–1443 May 2011
- Wang, W., Ruan, X., and Wang, X. (2013), "A novel second harmonic current reduction method for dual active bridge used in photovoltaic power system", in *2013 IEEE Energy Conversion Congress and Exposition*, pp. 1635–1639 Sept 2013
- Watanabe, H. and Itoh, J. (2017), "Isolated single-phase AC grid connected converter with small inductors and capacitors for micro-inverters", in *2017 IEEE Applied Power Electronics Conference and Exposition (APEC)*, pp. 1542–1549 March 2017
- Watanabe, H., Sakuraba, T., Furukawa, K., Kusaka, K., and i. Itoh, J. (2018), "Development of DC to Single-Phase AC Voltage Source Inverter With Active Power Decoupling Based on Flying Capacitor DC/DC Converter", *IEEE Transactions on Power Electronics*, Vol. 33, No. 6, pp. 4992–5004 June 2018
- Wenyi, Z. and Chen, W. (2009), "Research on voltage-source PWM inverter based on state analysis method", in *2009 International Conference on Mechatronics and Automation*, pp. 2183–2187 Aug 2009
- Wilkins, A., Veitch, J., and Lehman, B. (2010), "LED lighting flicker and potential health concerns: IEEE standard PAR1789 update", in *2010 IEEE Energy Conversion Congress and Exposition*, pp. 171–178 Sept 2010
- Wolfgang, E., Drofenik, U., and Gerling, W. (2007), "Reliability of Power Electronic Systems", *ECPE Tutorial, Nuremberg, Germany*, April 2007
- Xia, Y., Roy, J., and Ayyanar, R. (2017a), "A Capacitance-Minimized, Doubly Grounded Transformer less Photovoltaic Inverter With Inherent Active-Power Decoupling", *IEEE Transactions on Power Electronics*, Vol. 32, No. 7, pp. 5188–5201 July 2017a
- Xia, Y., Roy, J., and Ayyanar, R. (2017b), "A single phase doubly grounded, PV inverter using coupled inductor with integrated magnetics and active power decoupling technique", in *2017 IEEE Energy Conversion Congress and Exposition (ECCE)*, pp. 8–14 Oct 2017b
- Xiong, L., Zhuo, F., Wang, F., Liu, X., Chen, Y., Zhu, M., and Yi, H. (2016), "Static Synchronous Generator Model: A New Perspective to Investigate Dynamic Characteristics and Stability Issues of Grid-Tied PWM Inverter", *IEEE Transactions on Power Electronics*, Vol. 31, No. 9, pp. 6264–6280 Sept 2016
- Xu, S., Shao, R., Chang, L., and Mao, M. (2018), "Single-Phase Differential Buck-Boost Inverter with Pulse Energy Modulation and Power Decoupling Control", *IEEE Journal of Emerging and Selected Topics in Power Electronics*, pp. 1–1 2018
- Xue, L., Shen, Z., Boroyevich, D., Mattavelli, P., and Diaz, D. (2015), "Dual Active Bridge-Based Battery Charger for Plug-in Hybrid Electric Vehicle With Charging Current Containing Low Frequency Ripple", *IEEE Transactions on Power Electronics*, Vol. 30, No. 12, pp. 7299–7307 Dec 2015
- Xue, Y., Chang, L., Kjaer, S. B., Bordonau, J., and Shimizu, T. (2004), "Topologies of single-phase inverters for small distributed power generators: an overview", *IEEE Transactions on Power Electronics*, Vol. 19, No. 5, pp. 1305–1314 Sept 2004
- Yao, W., Wang, X., Zhang, X., Tang, Y., Loh, P. C., and Blaabjerg, F. (2015), "A unified active damping control for single-phase differential mode buck inverter with LCL-filter", in *2015 IEEE 6th International Symposium on Power Electronics for Distributed Generation Systems (PEDG)*, pp. 1–8 June 2015
- Yao, W., Xu, Y., Tang, Y., Loh, P. C., Zhang, X., and Blaabjerg, F. (2018), "IEEE JOURNAL OF EMERGING AND SELECTED TOPICS IN POWER ELECTRONICS, VOL. PP, NO. 99, 2018 Generalized Power Decoupling Control for Single-Phase Differential Inverters with Nonlinear Loads", *IEEE Journal of Emerging and Selected Topics in Power Electronics*, pp. 1–1 2018

- Young, K. D., Utkin, V. I., and Ozguner, U. (1999), "A control engineer's guide to sliding mode control", *IEEE Transactions on Control Systems Technology*, Vol. 7, No. 3, pp. 328–342 May 1999
- Zhang, H., Li, X., Ge, B., and Balog, R. S. (2017), "Capacitance, dc Voltage Utilization, and Current Stress: Comparison of Double-Line Frequency Ripple Power Decoupling for Single-Phase Systems", *IEEE Industrial Electronics Magazine*, Vol. 11, No. 3, pp. 37–49 Sept 2017
- Zhang, L., Ren, X., Ruan, X., and Chen, Q. (2013), "Control strategy for the front-end DC-DC converter to reduce the second-order harmonic current in the two-stage inverter", in *2013 Twenty-Eighth Annual IEEE Applied Power Electronics Conference and Exposition (APEC)*, pp. 719–726 March 2013
- Zhang, L., Ren, X., and Ruan, X. (2014), "A Bandpass Filter Incorporated Into the Inductor Current Feedback Path for Improving Dynamic Performance of the Front-End DC-DC Converter in Two-Stage Inverter", *IEEE Transactions on Industrial Electronics*, Vol. 61, No. 5, pp. 2316–2325 May 2014
- Zhang, L., Ruan, X., and Ren, X. (2015), "Second-Harmonic Current Reduction and Dynamic Performance Improvement in the Two-Stage Inverters: An Output Impedance Perspective", *IEEE Transactions on Industrial Electronics*, Vol. 62, No. 1, pp. 394–404 Jan 2015
- Zhang, L., Ruan, X., and Ren, X. (2018a), "One-Cycle Control for Electrolytic Capacitor-Less Second Harmonic Current Compensator", *IEEE Transactions on Power Electronics*, Vol. 33, No. 2, pp. 1724–1739 Feb 2018a
- Zhang, L., Ruan, X., and Ren, X. (2018b), "Second-Harmonic Current Reduction for Two-Stage Inverter With Boost-Derived Front-End Converter: Control Schemes and Design Considerations", *IEEE Transactions on Power Electronics*, Vol. 33, No. 7, pp. 6361–6378 July 2018b
- Zhao, B., Song, Q., Liu, W., and Sun, Y. (2014), "Overview of Dual-Active-Bridge Isolated Bidirectional DC-DC Converter for High-Frequency-Link Power-Conversion System", *IEEE Transactions on Power Electronics*, Vol. 29, No. 8, pp. 4091–4106 Aug 2014
- ZhengWei, XiangDeng, Gong, C., Chen, J., and Zhang, F. (2012), "A novel technique of low frequency input current ripple reduction in two-stage DC-AC inverter", in *IECON 2012 - 38th Annual Conference on IEEE Industrial Electronics Society*, pp. 139–143 Oct 2012
- Zhong, Q. and Weiss, G. (2011), "Synchronverters: Inverters That Mimic Synchronous Generators", *IEEE Transactions on Industrial Electronics*, Vol. 58, No. 4, pp. 1259–1267 April 2011
- Zhong, Q., Ming, W., Sheng, W., and Zhao, Y. (2017), "Beijing Converters: Bridge Converters With a Capacitor Added to Reduce Leakage Currents, DC-Bus Voltage Ripples, and Total Capacitance Required", *IEEE Transactions on Industrial Electronics*, Vol. 64, No. 1, pp. 325–335 Jan 2017
- Zhou, Y., Li, H., and Li, H. (2016), "A Single-Phase PV Quasi-Z-Source Inverter With Reduced Capacitance Using Modified Modulation and Double-Frequency Ripple Suppression Control", *IEEE Transactions on Power Electronics*, Vol. 31, No. 3, pp. 2166–2173 March 2016
- Zhu, G., Tan, S., Chen, Y., and Tse, C. K. (2013), "Mitigation of Low-Frequency Current Ripple in Fuel-Cell Inverter Systems Through Waveform Control", *IEEE Transactions on Power Electronics*, Vol. 28, No. 2, pp. 779–792 Feb 2013
- Zhu, G., Ruan, X., Zhang, L., and Wang, X. (2015), "On the Reduction of Second Harmonic Current and Improvement of Dynamic Response for Two-Stage Single-Phase Inverter", *IEEE Transactions on Power Electronics*, Vol. 30, No. 2, pp. 1028–1041 Feb 2015