REFERENCES

- Abbaspour-Tamijani, A., Rizk, J., and Rebeiz, G., "Integration of Filters and Microstrip Antennas," IEEE Antennas and Propagation Society International Symposium, 2002, pp. 874–877.
- Abed, D., Redadaa, S., and Kimouche, H., "Printed Ultra-wideband Stepped Circular Slot Antenna with Different Tuning Stubs," *Journal of Electromagnetic Waves and Applications*, 2013, v. 27, pp. 846-855.
- Adamiuk, G., Zwick, T., and Wiesbeck, W., "UWB Antennas for Communication Systems," *Proceedings of the IEEE*, 2012, v. 100, n. 7, pp. 2308-2321.
- Ahmed, K. U., and Virdee, B. S., "Ultra-wideband Bandpass Filter Based on Composite Right/Left Handed Transmission-line Unit-cell," *IEEE Transactions on Microwave Theory and Techniques*, 2013, v. 61, pp. 782–788.
- Ahmed, O., and Sebak, A. R., "A Printed Monopole Antenna with Two Steps and a Circular Slot for UWB Applications," *IEEE Antennas and Wireless Propagation Letters*, 2008, v. 7, pp. 411-413.
- Ahn, D., Park, J.-S., Kim, C.-S., Kim, J., Qian, Y., and Itoh, T., "A Design of the Low-Pass Filter Using the Novel Microstrip Defected Ground Structure," *IEEE Transactions on Microwave Theory and Techniques*, 2001, v. 49, n. 1, pp. 86–93.
- Aiello, G. R., and Rogerson, G. D., "Ultra-wideband Wireless Systems," *IEEE Microwave Magazine*, 2003, v. 4, pp. 36–47.
- Allen, B., Dohler, M., Okon, E. E., Malik, W. Q., Brown, A. K., and Edwards, D. J., "Ultra-Wideband Antennas and Propagation for Communications, Radar and Imaging," John Wiley & Sons Ltd, 2007.
- Amini, A., Oraizi, H., and Zadeh, M. A. C., "Miniaturized UWB Log-periodic Square Fractal Antenna," *IEEE Antennas and Wireless Propagation Letters*, 2015, v. 14, pp. 1322-1325.

- An, H., Nauwelaers, B., and Van de Capelle, A., "A New Approach of Broadband Microstrip Antenna Design," IEEE Antennas and Propagation Society International Symposium, Chicago, IL, USA, 1992, pp. 475-478.
- Azenui, N. C., and Yang, H. Y. D., "A Printed Crescent Patch Antenna for Ultrawideband Applications," *IEEE Antennas and Wireless Propagation Letters*, 2007, v. 6, pp. 113-116.
- Balanis, C. A., "Antenna Theory: Analysis and design," Hoboken, New Jersey, United States of America, John Wiley & Sons, Inc., 2005.
- Chen, H., Tang, P., Chen, K.-S., Zhao, H.-F., and Zhong, H., "Wideband Dual-mode Bandpass Filter Using a Modified Right-triangular Patch Resonator Overlapped with Input/output DMS," *Journal of Electromagnetic Waves and Applications*, 2013, v. 27, pp. 1365–1371.
- Chen, H-J., Huang, T-H., Chang, C-S., Chen, L-S., Wang, N-F., Wang, Y-H., and Houng, M-P., "A Novel Cross-shape DGS Applied to Design Ultra-wide Stopband Low-pass Filters," *IEEE Microwave and Wireless Components Letters*, 2006, v. 16, n. 5, pp. 252-254.
- Chen, J., Sheng, J., Gao, N., and Zhang, A., "Compact and High-selectivity Microstrip Bandpass Filter Using Quad-mode Resonator," *Microwave and Optical Technology Letters*, 2015, v. 57, pp. 478–481.
- Cheng, W., and Li, D. "Circularly Polarised Filtering Monopole Antenna Based on Miniaturised Coupled Filter," *Electronics Letters*, 2017, v. 53, n. 11, pp. 700-702.
- Chen, X. Q., Wang, L. X., Weng, L. H., and Shi, X. W., "Compact Low Pass Filter Using Novel Elliptic Shape DGS," *Microwave and Optical Technology Letters*, 2009, v. 51, n. 4, pp. 1088–1091.
- Chen, Y., and Zhou, Y., "Design of a Filter-antenna Subsystem for UWB Communications," 3rd IEEE International Symposium on Microwave, Antenna, Propagation and EMC Technologies for Wireless Communications, Beijing, 2009, pp. 593-595.
- Chu, Q.-X., Wu, X.-H., and Tian, X.-K., "Novel UWB Bandpass Filter Using Stubloaded Multiple-mode Resonator," *IEEE Microwave and Wireless Components Letters*, 2011, v. 21, pp. 403–405.

- Chuang, C.-T., and Chung, S.-J., "Synthesis and Design of a New Printed Filtering Antenna," *IEEE Transactions on Microwave Theory and Techniques*, 2011, v. 59, n. 3, pp. 1036–1042.
- Cristal, E. G. and Frankel, S., "Design of hairpin-line and hybrid haripin-parallelcoupledline filters", IEEE MTT-S Dig. 1971, 12–13.
- Dening, C., "Using Microwave CAD Programs to Analyze Microstrip Interdigital Filters," *Microwave Journal* 1989, 147–152.
- Djaiz, A., Nedil, M., Habib, M. A., and Denidni, T. A., "Design of a New UWBintegrated Antenna Filter with a Rejected WLAN Band at 5.8 GHz," *Microwave and Optical Technology Letters*, 2011, v. 53, pp. 1298–1302.
- Ertay, A. O., Abbak, M., and Simsek, S., "An Improved Stopband and Sharp Roll Off Microstrip Low Pass Filter with Defected Ground Structures," *International Journal of Microwave and Wireless Technologies*, 2016, v. 8, n. 3, pp. 573–581.
- Fallahzadeh, S., and Tayarani, M., "A New Microstrip UWB Bandpass Filter Using Defected Microstrip Structures," *Journal of Electromagnetic Waves and Applications*, 2010, v. 24, pp. 893-902.
- Federal Communications Commission (FCC), Revision of Part 15 of the Commission's Rules Regarding Ultra-Wideband Transmission System from 3.1 to 10.6 GHz.Washington, D.C., USA: FCC, 2002 (Tech. Rep. ET-Docket 98–153).
- Feng, D., Zhai, H., Xi, L., and Yang, D., "A New Filter Antenna Using Improved Stepped Impedance Hairpin Resonator," *Microwave and Optical Technology Letters*, 2017, v. 59, pp. 2934–2938.
- Fu, H., and Yu, Y., "A Novel Lowpass Filter Based on Multistage Defected Ground Structure," IEEE International Conference on Ubiquitous Wireless Broadband (ICUWB), Nanjing, 2016, pp. 1-4.
- Gao, S. S., Xiao, S. Q., Wang, J. P., Yang, X.-S., Wang, Y. X., and Wang, B.-Z., "A Compact UWB Bandpass Filter with Wide Stopband," *Journal of Electromagnetic Waves and Applications*, 2008, v. 22, pp. 1043-1049.
- Garcia-Garcia, J., Bonache, J., and Martin, F., "Application of Electromagnetic Bandgaps to the Design of Ultra-wide Bandpass Filters with Good Out-of-band Performance," *IEEE Transactions on Microwave Theory and Techniques*, 2006, v. 54, pp. 4136–4140.

- Ghatak, R., Sarkar, P., Mishra, R. K., and Poddar, D. R., "A Compact UWB Bandpass Filter with Embedded SIR as Band Notch Structure," *IEEE Microwave and Wireless Components Letters*, 2011, v. 21, pp. 261–263.
- Gomez-Garcia, R., and Alonso, J. I., "Systematic Method for the Exact Synthesis of Ultra-wideband Filtering Responses Using High-pass and Low-pass Sections," *IEEE Transactions on Microwave Theory and Techniques*, 2006, v. 54, pp. 3751– 3764.
- Gong, J.-Q., and Chu, Q.-X., "SCRLH TL Based UWB Bandpass Filter with Widened Upper Stopband," *Journal of Electromagnetic Waves and Applications*, 2008, v. 22, pp. 1985-1992.
- Goswami, S. A., and Karia, D., "A Compact Monopole Antenna for Wireless Applications with Enhanced Bandwidth," *International Journal of Electronics and Communications*, 2017, v. 72, pp. 33–39.
- Goussetis G., and Budimir D., Antenna filter for modern wireless systems. in Proc. 32nd Eur. Microw. Conf., 2002 Sep. 23–26: 1–3.
- Haykin, S., "Communication Systems," JohnWiley & Sons, New York, 1994.
- Hong, J. S., and Lancaster, M. J., "Microstrip Filters for RF/Microwave Applications," New York, USA: John Wiley & Sons; 2001.
- Hong, J.-S., "Microstrip Filters for RF/Microwave Applications," John Wiley & Sons, Inc., Hoboken, New Jersey, 2011.
- Hossain, M. J., Faruque, M. R. I., and Islam, M. T., "Design of a Patch Antenna for Ultra Wide Band Applications," *Microwave and Optical Technology Letters*, 2016, v. 58, pp. 2152–2156.
- Hu, H. L., Huang, X. D., and Cheng, C. H., "Ultra-wideband Bandpass Filter Using CPW-to-microstrip Coupling Structure," *Electronics Letters*, 2006, v. 42, pp. 586– 587.

IEEE Standard for Definitions of Terms for Antennas, IEEE std 145TM-2013, 2013.

Ishida, H., and Araki, K., "Design and Analysis of UWB Bandpass Filter with Ring Filter," IEEE MTT-S International Microwave Symposium Digest. 2004, pp. 1307–1310.

- Jianhong, Z., Xinwei, C., Guorui, H., Li, L., and Wenmei, Z., "An Integrated Approach to RF Antenna-filter Co-design," *IEEE Antennas and Wireless Propagation Letters*, 2009, v. 8, pp. 141–144.
- Jhariya, D., Azad, A. R., Mohan, A., and Sinha, M., "A Compact Modified U-shaped UWB Bandpass Filter," *Microwave and Optical Technology Letters*, 2015, v. 57, pp. 2172–2175.
- Joshi, A., and Singhal, R., "Lower Mode Excitation in Vertex-fed Slotted Hexagonal Sband Antenna," *International Journal of Electronics and Communications*, 2018, v. 87, pp. 180–185.
- Kim, C.-S., Park, J.-S., Ahn, D., and Lim, J.-B., "A Novel 1-D Periodic Defected Ground Structure for Planer Circuits," *IEEE Microwave and Guided Wave Letters*, 2000, v. 10, n. 4, pp. 131–133.
- Kumar, S., Gupta, R. D., and Parihar, M. S., "Multiple Band Notched Filter Using Cshaped and E-shaped Resonator for UWB Applications," *IEEE Microwave and Wireless Components Letters*, 2016, v. 26, pp. 340–342.
- Lai, H. W., and Luk, K. M., "Wideband Patch Antenna FED by Printed Meandering Strip," *Microwave and Optical Technology Letters*, 2008, v. 50, n. 1, pp. 188–192.
- Le Nadan, T., Coupez, J. P., Toutain, S., and C. Person, "Integration of an Antenna/Filter Device, Using a Multi-Layer, Multi-Technology Process," 28th European Microwave Conference, Amsterdam, Netherlands, 1998, pp. 672–677.
- Lee, E., Hall, P. S., and Gardner, P., "Compact Wideband Planar Monopole Antenna," *Electronics Letters*, 1999, v. 35, n. 25, pp. 2157–2158.
- Li, C., Tong, C., Qi, L., Zou, X., and Ji, M., "Multimode Resonator Based on Composite Right-/left-handed Transmission Line for UWB Bandpass Filter Application," *International Journal of RF and Microwave Computer-Aided Engineering*, 2015, v. 25, n. 9, pp. 815-824.
- Li, P., Liang, J., and Chen, X., "Study of Printed Elliptical/Circular Slot Antennas for Ultra Wideband Applications," *IEEE Transactions on Antennas and Propagation*, 2006, v. 54, n. 6, pp. 1670-1675.
- Liang, C.-H., and Chang, C.-Y., "Compact Wideband Bandpass Filters Using Steppedimpedance Resonators and Interdigital Coupling Structures," *IEEE Microwave and Wireless Components Letters*, 2009, v. 19, n. 9, pp. 551–553.

- Liang, J., Chiau, C. C., Chen, X., and Parini, C. G., "Study of a Printed Circular Disc Monopole Antenna for UWB Systems," *IEEE Transactions on Antennas and Propagation*, 2005, v. 53, pp. 3500-3504.
- Lim, J.-S., Kim, C.-S., Lee, Y.-T., Ahn, D., and Nam, S., "Design of Lowpass Filters Using Defected Ground Structure and Compensated Microstrip Line," *Electronics Letters*, 2002, v. 38, n. 22, pp. 1357–1358.
- Lin, C. C., Jin, P., and Ziolkowski, R. W., "Single, Dual and Tri-Band-Notched Ultrawideband (UWB) Antennas Using Capacitively Loaded Loop (CLL) Resonators," *IEEE Transactions on Antennas and Propagation*, 2012, v. 60, pp. 102-109.
- Lingqin, M., Long, R., and Jingsong, H., "Design of a SIR Bandpass Filter with Spurious Passband Suppression Using Defected Ground Structure and Spurline," IEEE MTT-S International Microwave Workshop Series on Millimeter Wave Wireless Technology and Applications (IMWS), Nanjing, China, 2012, pp. 1–4.
- Liu, H., Sun, L., and Shi, Z., "Dual-bandgap Characteristics of Spurline Filters and its Circuit Modeling," *Microwave and Optical Technology Letters*, 2007, v. 49, pp. 2805–2807.
- Liu, H.-W., Li, Z.-F., Sun, X.-W., and Mao J.-F., "An Improved 1-D Periodic Defected Ground Structure for Microstrip Line," *IEEE Microwave and Wireless Components Letters*, 2004, v. 14, n. 4, pp. 180–182.
- Liu, J., Zhong, S., and Esselle, K. P., "A Printed Elliptical Monopole Antenna with Modified Feeding Structure for Bandwidth Enhancement," *IEEE Transactions on Antennas and Propagation*, 2011, v. 59, n. 2, pp. 667–70.
- Liu, J., Esselle, K. P., Hay, S. G., and Zhong, S. S., "Compact Super-wideband Asymmetric Monopole Antenna with Dual-branch Feed for Bandwidth Enhancement," *Electronics Letters*, 2013, v. 49, n. 8, pp. 515–516.
- Liu, S., Xu, J., and Xu, Z., "Sharp Roll-off Lowpass Filter Using Interdigital DGS Slot," *Electronics Letters*, 2015, v. 51, n. 17, pp. 1343-1345.
- Mandal, M. K., and Chen, Z. N., "Compact Wideband Coplanar Stripline Bandpass Filter with Wide Upper Stopband and its Application to Antennas," *IET Microwaves, Antennas & Propagation*, 2010, v. 4, n. 12, pp. 2166–2171.

- Mandal, M. K., and Sanyal, S. "A Novel Defected Ground Structure for Planar Circuits," IEEE Microwave and Wireless Components Letters, 2006, v. 16, n. 2, pp. 93–95.
- Mansour, G., Lancaster, M. J., Hall, P. S., Gardner, P., and Nugoolcharoenlap, E., "Design of Filtering Microstrip Antenna Using Filter Synthesis Approach," *Progress In Electromagnetics Research*, 2014, v. 145, pp. 59-67.
- Matthaei, G.L., "Interdigital Band-pass Filters," *IRE Transactions on Microwave Theory and Techniques*, 1962, v. 10, pp. 479–492.
- Matthaei, G. L., Young, L., and Jones, E. M. T., "Microwave Filters, Impedance-Matching Networks, and Coupling Structures," vol. 1. NewYork: McGraw-Hill, 1964.
- Matthaei, G., Young, L., and Jones, E. M. T., "Microwave Filters, Impedance-Matching Networks, and Coupling Structures", Artech House, Norwood, MA, 1980.
- Mirzaee, M., and Virdee, B. S., "Realisation of highly Compact Planar Lowpass Filter for UWB RFID Applications," *Electronics Letters*, 2013, v. 49, n. 22, pp. 1396-1398.
- Mollah, M. N., Karmakar, N. C., and Fu, J. S., "Investigation of Novel Tapered Hybrid Defected Ground Structure (DGS)," *International Journal of RF and Microwave Computer-Aided Engineering*, 2005, v. 15, n. 6, pp. 544-550.
- Moyra, T., Parui, K., and Das, S., "Application of a Defected Ground Structure and Alternative Transmission Line for Designing a Quasi-elliptic Lowpass Filter and Reduction of Insertion Loss," *International Journal of RF and Microwave Computer-Aided Engineering*, 2010, v. 20, n. 6, pp. 682-688.
- Nie, W., Luo, S., Guo, Y., and Fan, Y., "Compact Bandpass Filter with Improved Upper Stopband," *Electronics Letters*, 2014, v. 50, pp. 1065–1067.
- Nguyen, C., and Chang, K., "On the Analysis and Design of Spurline Bandstop Filters," *IEEE Transactions on Microwave Theory and Techniques*, 1985, v. 33, pp. 1416–1421.
- Pandey, G. K., and Meshram, M. K., "A Printed High Gain UWB Vivaldi Antenna Design Using Tapered Corrugation and Grating Elements," *International Journal of RF and Microwave Computer-Aided Engineering*, 2015, v. 25, pp. 610–618.

Pozar, D. M., "Microwave Engineering," 3rd edition USA, John Wiley & Sons, 2005.

- Pues, H. F., and Van de Capelle, A. R., "An Impedance-matching Technique for Increasing the Bandwidth of Microstrip Antennas," *IEEE Transactions on Antennas* and Propagation, 1989, v. 37, n. 11, pp. 1345–1354.
- Queudet, F., Pele, I., Froppier, B., Mah,e Y., and Toutain, S., "Integration of Pass-band Filters in Patch Antennas," 2002 32nd European Microwave Conference, Milan, Italy, 2002, pp. 685-688.
- Quintero, G., Zürcher, J. -F., and Skrivervik, A. K., System Fidelity Factor: A New Method for Comparing UWB Antennas, *IEEE Transactions on Antennas and Propagation*, 2011, v. 59, n. 7, pp. 2502–2512.
- Ranjan, P., Raj, S., Upadhyay, G., Tripathi, S., and Tripathi, V. S., "Circularly Slotted Flower Shaped UWB Filtering Antenna with High Peak Gain Performance," *International Journal of Electronics and Communications*, 2017, v. 81, pp. 209– 217.
- Ryder, J. D., "Networks, Lines and Fields," Prentice Hall of India Private Limited, New Delhi, May, 1994.
- Sahoo, A. K., Gupta, R. D., and Parihar, M.S., "Highly Selective Integrated Filter Antenna for UWB Application," *Microwave and Optical Technology Letters*, 2017, v. 59, pp. 1032–1037.
- Sam, W. Y., and Zakaria, Z., "Design of a Dual-notched Ultra-wideband (UWB) Planar Antenna Using L-shaped Bandstop Resonator," 11th European Conference on Antennas and Propagation (EUCAP), Paris, 2017, pp. 2237–2241.
- Sarkar, P., Ghatak, R., Pal, M., and Poddar D. R., "Compact UWB Bandpass Filter with Dual Notch Bands Using Open Circuited Stubs," *IEEE Microwave and Wireless Components Letters*, 2012, v. 22, n. 9, pp. 453–455.
- Sayidmarie, K. H., and Fadhel, Y. A., "Design Aspects of UWB Printed Elliptical Monopole Antenna with Impedance Matching," Loughborough Antennas & Propagation Conference (LAPC), Loughborough, 2012, pp. 1-4.
- Shaman, H. N., "New S-band Bandpass Filter (BPF) with Wideband Passband for Wireless Communication Systems," *IEEE Microwave and Wireless Components Letters*, 2012, v. 22, pp. 242–244.

- Sharma, A. K., Mittal, A., and Reddy, B. V. R., "Slot Embedded Dual-band Patch Antenna for WLAN and WiMAX Applications," *Electronics Letters*, 2015, v. 51, n. 8, pp. 608–609.
- Shi, S., Choi, W.-W., Che, W., Tam, K.-W., and Xue, Q., "Ultra-wideband Differential Bandpass Filter with Narrow Notched Band and Improved Common-mode Suppression by DGS," *IEEE Microwave and Wireless Components Letters*, 2012, v. 22, pp. 185–187.
- Song, Y., Yang, G.-M., and Geyi, W., "Compact UWB Bandpass Filter with Dual Notched Bands Using Defected Ground Structures," *IEEE Microwave and Wireless Components Letters*, 2014, v. 24, pp. 230–232.
- Stutzman, W. L., and Thiele, G. A., "Antenna Theory and Design," John Wiley & Sons, 1981.
- Sun, G. H., Wong, S. W., Zhu, L., and Chu, Q. X., "A Compact Printed Filtering Antenna with Good Suppression of Upper Harmonic Band," *IEEE Antennas and Wireless Propagation Letters*, 2016, v. 15, pp. 1349–1352.
- Taibi, A., Trabelsi, M., Slimane, A., Belaroussi, M. T., and Raskin, J.-P., "A Novel Design Method for Compact UWB Bandpass Filters," *IEEE Microwave and Wireless Components Letters*, 2015, v. 25, n. 1, pp. 4–6.
- Tang, M.-C., and Shi, T., "Ziolkowski RW. Planar Ultrawideband Antennas with Improved Realized Gain Performance," *IEEE Transactions on Antennas and Propagation*, 2016, v. 64, pp. 61-69.
- Tanii, K., and Wada, K., "Wideband Bandpass Filter Composed of Dual-path Resonators Using Coupled-line and Transmission Line with Inductive Elements," *IEEE Microwave and Wireless Components Letters*, 2014, v. 24, pp. 14–16.
- Ting, S.-W., Tam, K.-W., and Martins, R. P., "Miniaturized Microstrip Lowpass Filter with Wide Stopband Using Double Equilateral U-shaped Defected Ground Structure," *IEEE Microwave and Wireless Components Letters*, 2006, v. 16, n. 5, pp. 240–242.
- Tripathi, S., Mohan, A., and Yadav, S. "Hexagonal Fractal Ultra-wideband Antenna Using Koch Geometry with Bandwidth Enhancement," *IET Microwaves, Antennas* & Propagation, 2014, v. 8, n. 15, pp. 1445-1450.

- Tu, W.-H., and Chang, K., "Compact Microstrip Bandstop Filter Using Open Stub and Spurline," *IEEE Microwave and Wireless Components Letters*, 2005, v. 15, pp. 268–270.
- Vala, A., Patel, A., Goswami, R., and Mahant, K., "Defected Ground Structure Based Wideband Microstrip Low-pass Filter for Wireless Communication," *Microwave* and Optical Technology Letters, 2017, v. 59, n. 5, pp. 993–996.
- Wang, H., Chu, Q.-X., and Gong, J.-Q., "A Compact Wideband Microstrip Filter Using Folded Multiple-mode Resonator," *IEEE Microwave and Wireless Components Letters*, 2009, v. 19, pp. 287–289.
- Wang, H., Zheng, Y.Y., and Kang, W., "UWB Bandpass Filter with Novel Structure and Super Compact Size," *Electronics Letters*, 2012, v. 48, n.17, pp. 1068–1069.
- Wang, H., Zhu, L., and Menzel, W., "Ultra-wideband Bandpass Filter with Hybrid Microstrip/CPW Structure," *IEEE Microwave and Wireless Components Letters*, 2005, v. 15, pp. 844–846.
- Wang, L., Chen, W., Wang, P., Xue, X., Dong, J., and Feng, Z., "Design of Asymmetrical Spurline Filter for a High Power SiC MESFET Class-E Power Amplifier," *Microwave and Optical Technology Letters*, 2010, v. 52, pp. 1650– 1652.
- Wei, F., Chen, P., Chen, L., and Shi, X. W., "Design of a Compact UWB Bandpass Filter with Defected Ground Structure," *Journal of Electromagnetic Waves and Applications*, 2008, v. 22, pp. 1783-1790.
- Weng, L. H., Shi, S. J., Chen, X. Q., and Shi, X. W., "A Novel CSRRs DGS as Lowpass Filter," *Journal of Electromagnetic Waves and Applications*, 2008, v. 22, pp. 1899– 1906.
- Wong, S. W., and Zhu, L., "EBG-embedded Multiple-mode Resonator for UWB Bandpass Filter with Improved Upper-stopband Performance," *IEEE Microwave and Wireless Components Letters*, 2007, v. 17, pp. 421–423.
- Wong, S. W., Huang, T. G., Mao, C. X., Chen, Z. N., and Chu, Q. X., "Planar Filtering Ultra-Wideband (UWB) Antenna with Shorting Pins," *IEEE Transactions on Antennas and Propagation*, 2013, v. 61, n. 2, pp. 948-953.

- Woo, D.-J., Lee, T.-K., Lee, J.-W., Pyo, C.-S., and Choi, W.-K., "Novel U-Slot and V-Slot DGSs for Bandstop Filter with Improved Q Factor," *IEEE Transactions on Microwave Theory and Techniques*, 2006, v. 54, n. 6, pp. 2840–2847.
- Wu, W. J., Liu, Q. F., Zhang, Q., and Deng, J. Y., "Co-design of a Compact Dual-band Filter-antenna for WLAN Application," Progress In Electromagnetics Research, 2013, v. 40, pp. 129-139.
- Wu, W. J., Yin, Y. Z., Zuo, S. L., Zhang, Z. Y., and Xie, J. J., "A New Compact Filterantenna for Modern Wireless Communication Systems," *IEEE Antennas and Wireless Propagation Letters*, 2011, v. 10, pp. 1131-1134.
- Yang, G., Kang, W., and Wang, H., "An UWB Bandpass Filter Based on Single Ring Resonator and Shorted Stubs Loaded without Coupled Feed Lines," *Journal of Electromagnetic Waves and Applications*, 2011, v. 25, pp. 2159–2167.
- Yang, G. M., Jin, R., Geng, J., Huang, X., and Xiao, G., "Ultra-wideband Bandpass Filter with Hybrid Quasi-lumped Elements and Defected Ground Structure," *IET Microwaves, Antennas & Propagation*, 2007, v. 1, n. 3, pp. 733–736.
- Yang, G.-M., Jin, R., Vittoria, C., Harris, V. G., and Sun, N. X., "Small Ultra-wideband (UWB) Bandpass Filter with Notched Band," *IEEE Microwave and Wireless Components Letters*, 2008, v. 18, n. 6, pp. 176–178.
- Yang, L., and Giannakis, G. B., "Ultra-wideband Communications an Idea whose Time has Come," *IEEE Signal Processing Magazine*, 2004, v. 21, n. 6, pp. 26–54.
- Yao, B., Zhou, Y., Cao, Q., and Chen, Y., "Compact UWB Bandpass Filter with Improved Upper-stopband Performance," *IEEE Microwave and Wireless Components Letters*, 2009, v. 19, n. 1, pp. 27–29.
- Yilin, C., and Yonggang, Z., "Design of a Filter-antenna Subsystem for UWB Communications," 3rd IEEE International Symposium on Microwave, Antenna, Propagation and EMC Technologies for Wireless Communications, Beijing, 2009, pp. 593-595.
- Yu, W.-H., Mou, J.-C., Li, X., and Lv, X., "A Compact Filter with Sharp-transition and Wideband-rejection Using the Novel Defected Ground Structure," *Journal of Electromagnetic Waves and Applications*, 2009, v. 23, pp. 329–340.

- Yusuf, Y., Cheng, H., and Gong, X., "Co-designed Substrate-integrated Waveguide Filters with Patch Antennas," *IET Microwaves, Antennas & Propagation*, 2013, v. 7, n. 7, pp. 493–501.
- Zayniyev, D., and Budimir, D., "An Integrated Antenna-filter with Harmonic Rejection," 3rd European Conference on Antennas and Propagation, Berlin, 2009, pp. 393-394.
- Zayniyev, D., and Budimir, D., "Dual-band Microstrip Antenna Filter for Wireless Communications," IEEE Antennas and Propagation Society International Symposium, Toronto, 2010, pp. 1-4.
- Zhang, R., and Mansour, R. R., "A Novel Lowpass Microstrip Filter Using Metalloaded Slots in the Ground Plane," IEEE MTT-S International Microwave Symposium Digest (IEEE Cat. No.04CH37535), 2004, pp. 1311-1314.
- Zhang, T., Xiao, F., Bao, J., and Tang, X., "Compact Ultra-wideband Bandpass Filter with Good Selectivity," *Electronics Letters*, 2016, v. 52, n. 3, pp. 210-212.
- Zhou, J.-M., Zhou, L.-H., Tang, H., Yang, Y.-J., Chen, J.-X., and Bao, Z.-H., "Novel Compact Microstrip Lowpass Filters with Wide Stopband Using Defected Ground Structure," *Journal of Electromagnetic Waves and Applications*, 2011, v. 25, n. 7, pp. 1009–1019.
- Zhu, L., Sun, S., AND Menzel, W., "Ultra-wideband (UWB) Bandpass Filter Using Multiple-mode Resonator," *IEEE Microwave and Wireless Components Letters*, 2005, v. 15, pp. 796–798.
- Zuo, J., Chen, X., Han, G., Li, L., and Zhang, W., "An Integrated Approach to RF Antenna-filter co-design," *IEEE Antennas and Wireless Propagation Letters*, 2009, v. 8, pp. 141–144.