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IEEE Member Number: 80642465

Region: 8

Grade: Senior Member

Curriculum Vitae

Flavia Grassi received the Laurea (Master) and the Ph.D. Degrees in Electrical Engineering from Politecnico di Milano, Milan, Italy, in 2002 and 2006, respectively. Since 2008, she is an Assistant Professor with the Department of Electronics, Information and Bioengineering of the same technical university.

In 2003, she joined the Electromagnetic Compatibility (EMC) research group led by prof. S. A. Pignari, and has been involved in EMC-related research activities, at the beginning as a Ph.D. student (2003-2006), then as a research assistant (2006-2008), and subsequently as an Assistant Professor (2008-to date).

In 2007, she obtained a Post-doctoral Fellowship supported by the European Space Agency (ESA). In the framework of this Partnering/Networking agreement between ESA and Politecnico di Milano, from March 2008 to March 2009 she was with the Electromagnetics and Space Environment Division of the European Space Research and Technology Centre (ESTEC) of the European Space Agency (ESA), Noordwijk, The Netherlands.

Her research interests centre around EMC. Particularly, she works on (a) theoretical and experimental characterization of electromagnetic interference via lumped and distributed circuit modeling, (b) development of innovative test procedures for unit and system-level EMC assessment of avionic, automotive, and railway systems, and (c) EMC issues related to the application of the PLC technology in ac and dc powerlines. She has authored and co-authored around 60 papers in international journals and conference proceedings.

In 2008, she was awarded the URSI Young Scientist Award (XXIXth URSI General Assembly, Chicago, Illinois, USA, 9-16 Aug. 2008).

In 2015, she was awarded the title of Distinguished Reviewer of the IEEE Transactions on Electromagnetic Compatibility for her serving as reviewer for the year 2014.

She serves as Reviewer for several journals, including the IEEE TRANS. ON ELECTROMAGNETIC COMPATIBILITY, IEEE TRANS. ON IND. ELECTRONICS, IET ELECTRICS LETTERS, RADIO SCIENCE, JOURNAL OF ELECTROMAGN. WAVES AND APPLICATIONS PROGRESS IN ELECTROMAGNETIC RESEARCH (PIER).

Since 2007, she is Member of the IEEE EMC Society, and for the two-year term 2008-2009, she served as Treasurer of the IEEE EMC-S Italy Chapter.

In 2013, she was elevated to the IEEE Senior Member grade.

Teaching Activity

Dr. Grassi has taught and teaches courses of Circuit Theory (lectures and practice) and Electromagnetic Compatibility (currently practice and laboratories) for Bachelor and Master Degrees in Electrical and Civil and Environmental Engineering at *Politecnico di Milano* (POLIMI), Milan, Italy.

Particularly, since the academic year 2009/10 she is lecturer of the course “Elettrotecnica” (i.e., Circuit Theory) for the Bachelor and Master Degrees in Civil and Environmental Engineer.

In 2013, 2014, 2015 she taught the course “Electromagnetic Compatibility”, for the Master Degree in Electrical Engineering at *Ecole Supérieure d’Ingénieurs en Génie Électrique* (ESIGELEC), Rouen, France.

She also taught refresher courses for industries. Particularly, in March 2011 she taught a course of circuit theory for engineers and technicians of “Rold elettrotecnica S.r.l.”, Nerviano, Milano. In October-November 2012 she taught an advanced course of electromagnetic compatibility (with focus on PCB design and automotive applications) for design engineers of Vimercati S.p.a, Pero, Italy.

Finally, she serves as supervisor for Master and PhD students.

Research Activity

Dr. Grassi has mainly contributed to: (a) the theory and practice of the bulk current injection (BCI) technique for susceptibility assessment of wiring harnesses; (b) channel characterization and EMC assessment of the Powerline Communications (PLC) technology onboard satellites; (c) development of innovative test procedures for radiated susceptibility verifications; (d) deterministic and statistic modeling of wiring interconnections (transmission lines).

Additionally, a recent field of research is concerned with EMI issues in electrical vehicles.

Refereed Papers in Scientific Journals (reverse chronological order)

- P1. G. Spadacini, F. Grassi, S. A. Pignari, “Field-to-Wire Coupling Model for the Common Mode in Random Bundles of Twisted-Wire Pairs,” *IEEE Trans. Electromagn. Compat.*, early access article. DOI: 10.1109/TEMC.2015.2414356.
- P2. P. Degauque, I. Stievano; S. Pignari, V. Degardin, F. Canavero, F. Grassi, F. Canete, “Power Line Communication: Channel characterization and modeling for transportation

- systems," *IEEE Vehicular Technology Magazine*, early access article. DOI: 10.1109/MVT.2015.2411111.
- P3. **F. Grassi**, X. Wu, Y. Yang, G. Spadacini, S. A. Pignari, "Modeling of imbalance in differential lines targeted to SPICE simulation," *Progress In Electromagnetics Research B*, vol. 62, pp. 225–239, 2015.
(Online at: <http://onlinewww.jpier.org/pierb/pier.php?paper=15012304>)
- P4. **F. Grassi**, Y. Yang, X. Wu, G. Spadacini, S. A. Pignari, "On mode conversion in geometrically-unbalanced differential lines and its analogy with crosstalk," *IEEE Trans. Electromagn. Compat.*, vol. 57, no. 2, pp. 283-291, April 2015, DOI: 10.1109/TEMC.2014.2372894.
- P5. G. Spadacini, **F. Grassi**, F. Marliani, S. A. Pignari, "Transmission-line model for field-to-wire coupling in bundles of twisted-wire pairs above ground," *IEEE Trans. Electromagn. Compat.*, vol. EMC-56, no. 6, pp. 1682-1690, Dec. 2014. DOI: 10.1109/TEMC.2014.2327195.
- P6. **F. Grassi**, G. Spadacini, and S. A. Pignari, "SPICE behavioral modeling of RF Current injection in wire bundles," *IEICE Trans. Commun.*, vol. E97-B, no. 2, pp. 424-431, Feb 2014.
- P7. **F. Grassi**, G. Spadacini, and S. A. Pignari, "The concept of weak imbalance and its role in the emissions and immunity of differential lines," *IEEE Trans. Electromagn. Compat.*, vol. EMC-55, no. 6, pp. 1346-1349, Dec. 2013.
- P8. **F. Grassi**, S. A. Pignari, "Bulk current injection in twisted-wire pairs with not perfectly balanced terminations," *IEEE Trans. Electromagn. Compat.*, vol. EMC-55, no. 6, pp. 1293-1301, Dec. 2013.
- P9. **F. Grassi** and S. A. Pignari, "Immunity to conducted noise of data transmission along DC power lines involving twisted-wire pairs above ground," *IEEE Trans. Electromagn. Compat.*, vol. EMC-55, no. 1, pp. 195-207, Feb. 2013.
- P10. **F. Grassi**, S. A. Pignari, J. Wolf, "Channel characterization and EMC assessment of a PLC system for spacecraft DC differential power buses," *IEEE Trans. Electromagn. Compat.*, vol. 53, no. 3, pp. 664 - 675, Aug. 2011.
- P11. **F. Grassi**, S. A. Pignari, "Upper bound and dispersion of the outdoor powerline channel frequency-response," *IEICE Trans. on Communications*, vol. E93-B, no. 7, pp. 1814-1820, July 2010.
- P12. **F. Grassi**, G. Spadacini, F. Marliani, and S. A. Pignari, "Use of double bulk current injection for susceptibility testing of avionics," *IEEE Trans. Electromagn. Compat.*, EMC-50, no. 3, part 1, pp. 524-535, Aug. 2008.
- P13. **F. Grassi**, F. Marliani, and S. A. Pignari, "Circuit modeling of injection probes for bulk current injection," *IEEE Trans. Electromagn. Compat.*, vol. EMC-49, no. 3, pp. 563-576, Aug. 2007.
- P14. S. A. Pignari and **F. Grassi**, "Crosstalk-based radiated susceptibility test," *Electronics Letters*, Vol. 40, Issue: 22, 28 Oct. 2004, pp. 1398-1399.

Refereed Conference Papers (reverse chronological order)

- C1. L. Badini, **F. Grassi**, G. Spadacini, S. A. Pignari "Sensitivity of mode conversion in geometrically-unbalanced coupled differential lines," accepted for presentation, *ICEAA 2015, Int. Conf. on Electromagnetics and Advanced Applications, Torino, Italy, Sep. 7-11, 2015*.
- C2. A. F. Finizio, **F. Grassi**, G. Spadacini, R. Colombo, S. A. Pignari "De-embedding setup-related effects to characterize coupling devices for conducted immunity testing," accepted for presentation, *ICEAA 2015, Int. Conf. on Electromagnetics and Advanced Applications, Torino, Italy, Sep. 7-11, 2015*.
- C3. **F. Grassi**, G. Spadacini, S. A. Pignari "Effects of imbalance on conducted immunity of a PLC link onto a DC power-bus for spacecraft," accepted for presentation, *APEMC 2015, Asia-Pacific Int. Symp. on Electromagn. Compat., Taipei, Taiwan, May 25-29, 2015*.
- C4. G. Spadacini, **F. Grassi**, S. A. Pignari "Statistical estimation of the electromagnetic noise induced by field-to-wire coupling in random bundles of twisted-wire pairs," accepted for presentation, *APEMC 2015, Asia-Pacific Int. Symp. on Electromagn. Compat., Taipei, Taiwan, May 25-29, 2015*.
- C5. G. Spadacini, **F. Grassi**, S. A. Pignari "SPICE simulation in time-domain of the CISPR 25 test setup for conducted emissions in electric vehicles," accepted for presentation, *APEMC 2015, Asia-Pacific Int. Symp. on Electromagn. Compat., Taipei, Taiwan, May 25-29, 2015*.
- C6. **F. Grassi**, G. Spadacini, S. A. Pignari, C. Rostamzadeh "On the use of bulk current injection for testing the immunity of CAN-bus lines," in *Proc. 3rd IEEE Int. Conf. on Connected Vehicles and Expo (ICCVE 2014), Messe Wien, Vienna, Austria, Nov. 3-7, 2014*, pp.1-6.
- C7. A. Beltramelli, **F. Grassi**, G. Spadacini, S. A. Pignari, "Modeling conducted noise propagation along high-voltage DC power buses for electric vehicle applications," in *Proc. 3rd IEEE Int. Conf. on Connected Vehicles and Expo (ICCVE 2014), Messe Wien, Vienna, Austria, Nov. 3-7, 2014*, pp.1-6.
- C8. D. Bellan, G. Spadacini, **F. Grassi**, S. A. Pignari, "Measurement and modeling of low-frequency electromagnetic noise generated by moving trains in 25 kV ac high-speed railway lines," in *Proc. 3rd IEEE Int. Conf. on Connected Vehicles and Expo (ICCVE 2014), Messe Wien, Vienna, Austria, Nov. 3-7, 2014*, pp.1-6.
- C9. Y. Yang, X. Wu, **F. Grassi**, G. Spadacini, S. A. Pignari, "Upper-bounds to the near- and far-end conversion loss in unbalanced differential lines," in *Proc. 2014 Asia-Pacific Microwave Conf. (APMC), Sendai, Japan, Nov. 4-7, 2014*, pp. 393-395. ISBN 978-4-902339-32-1.
- C10. G. Spadacini, **F. Grassi**, S. A. Pignari, "Influence of load imbalance on noise induced in a twisted-wire pair illuminated by a random plane-wave spectrum," in *Proc. 2014 Asia-Pacific Microwave Conf. (APMC), Sendai, Japan, Nov. 4-7, 2014*, pp. 73-75. ISBN 978-4-902339-32-1.
- C11. G. Spadacini, **F. Grassi**, S. A. Pignari, "A closed-form low-frequency statistical model for field-to-wire coupling in twisted-wire pairs with non-ideal twisting," in *Proc. XXXIth General Assembly of International Union of Radio Science (U.R.S.I.), Beijing, P. R. China, Aug. 16-23, 2014, Commission E, Paper E09.7*. ISBN 978-1-4673-5225-3/14.

- C12. X. Wu, Y. Yang, **F. Grassi**, G. Spadacini, S. A. Pignari, "Statistical characterization of line-imbalance in differential lines," in Proc. *XXXIth General Assembly of International Union of Radio Science (U.R.S.I.), Beijing, P. R. China, Aug. 16-23, 2014, Commission E, Paper E05.2*, pages 1-4. ISBN 978-1-4673-5225-3/14. DOI: 10.1109/URSIGASS.2014.6929519.
- C13. G. Spadacini, **F. Grassi**, S. A. Pignari, F. Marliani, "Frequency-response variability of voltages induced by field-to-wire coupling in random bundles of twisted-wire pairs on-board small satellites," in Proc. *XXXIth General Assembly of International Union of Radio Science (U.R.S.I.), Beijing, P. R. China, Aug. 16-23, 2014, Commission E, Paper E02.2*. ISBN 978-1-4673-5225-3/14.
- C14. **F. Grassi**, G. Spadacini, S. A. Pignari, F. Marliani, "Sensitivity to setup configuration of the response of differential lines driven by an external field," in Proc. *2014 IEEE Int. Symp. on Electromagn. Compat.*, Tokyo, Japan, May 12-16, 2014, pp. 852-855.
- C15. **F. Grassi**, C. Rostamzadeh, P. Kolbe, G. Spadacini, S. A. Pignari, "Assessing linearity of injection probes used in BCI test setups for automotive applications," in Proc. *2013 Int. Symp. on Electromagn. Compat.*, Denver, CO, USA, Aug. 5-9, 2013, pp. 129-133. ISBN 978-1-4799-0409-9.
- C16. G. Spadacini, **F. Grassi**, and S. A. Pignari, "On the combined effect of random nonuniformity and deformation of twisting on the radiated immunity of twisted-wire pairs," in Proc. *2013 IEEE Int. Symp. on Electromagn. Compat.*, Denver, CO, USA, Aug. 5-9, 2013, pp. 489-493. ISBN 978-1-4799-0409-9.
- C17. **F. Grassi**, C. Rostamzadeh, D. Bellan, G. Spadacini, S. A. Pignari, "Assessment of the bulk current injection test procedure based on the substitution method," in Proc. *APEMC 2013, Asia-Pacific Int. Symp. on Electromagn. Compat.*, Melbourne, Australia, May 20-23, 2013, pp. 418-421. ISBN 9781922107022.
- C18. D. Bellan, G. Spadacini, **F. Grassi**, E. Fedeli, S. A. Pignari, "Modeling strategies for conducted and radiated emissions in high-speed railway lines," in Proc. *APEMC 2010, Asia-Pacific Int. Symp. on Electromagn. Compat.*, Melbourne, Australia, May 20-23, 2013, pp. 288-291. ISBN 9781922107022.
- C19. **F. Grassi**, G. Spadacini, and S. A. Pignari, "Human exposure in arc-welding processes: current versus previous ICNIRP basic restrictions," in Proc. *2012 IEEE Int. Symp. on Electromagn. Compat.*, Pittsburgh, PA, USA, Aug. 5-10, 2012, pp. 749-754. ISBN 978-1-4673-2059-7.
- C20. **F. Grassi**, S. A. Pignari and J. Wolf, "Design and SPICE simulation of coupling circuits for powerline communications onboard spacecraft," in Proc. *2012 ESA Workshop on Aerospace EMC*, Venezia, Italy, May 21-23, 2012, pp. 1-4. ISBN 978-92-9092-266-7.
- C21. L. Ghislanzoni, **F. Grassi**, F. Marliani, S. A. Pignari, and G. Spadacini, "Terminal units for experimental assessment of bundles of twisted-wire pairs exposed to external radiation," in Proc. *2012 ESA Workshop on Aerospace EMC*, Venezia, Italy, May 21-23, 2012, pp. 1-4. ISBN 978-92-9092-266-7.
- C22. **F. Grassi**, S. A. Pignari, "Coupling/decoupling circuits for powerline communications in differential DC power buses," in Proc. *2012 IEEE Int. Symp. on Power Line Communications and its Applications*, Beijing, China, March 27-30, 2012, pp. 392-397. ISBN 978-1-4673-0359-0.
- C23. **F. Grassi** and S. A. Pignari, "Electromagnetic simulation of a bulk current injection test setup for automotive applications," in Proc. *Progress in Electromagnetic Research*

Symposium (PIERS 2011), Suzhou, China Sept. 12-16, 2011, pp. 1406-1409. ISSN 1559-9450.

- C24.** C. Rostamzadeh, **F. Grassi**, and F. Kashefi, "Modeling SMT ferrite beads for SPICE simulation," in *Proc. 2011 IEEE Int. Symp. on Electromagn. Compat.*, Long Beach, CA, USA, Aug. 14-19, 2011, pp. 530-535. ISBN 978-1-4577-0810-7.
- C25.** **F. Grassi** and S. A. Pignari, "Influence of power cable cross-section on EMI filter performance in three-phase systems with long feeders," in *Proc. 2010 Asia-Pacific Radio Science Conference (AP-RASC'10)*, Toyama, Japan, Sept. 22-26, 2010, paper EA-5, ISBN 978-4-88552-250-5C3855.
- C26.** **F. Grassi** and S. A. Pignari, "Extraction and SPICE implementation of a bulk current injection probe model from measurements at the calibration-jig ports," in *Proc. 2010 Asia-Pacific Radio Science Conference (AP-RASC'10)*, Toyama, Japan, Sept. 22-26, 2010, paper EA-6, ISBN 978-4-88552-250-5C3855.
- C27.** **F. Grassi** and S. A. Pignari, "Characterization of the bulk current injection calibration-jig for probe-model extraction," in *Proc. 2010 IEEE Int. Symp. on Electromagn. Compat.*, Fort Lauderdale, FL, USA, July 25-30, 2010, pp. 344-347. ISBN 978-1-4244-6307-7.
- C28.** S. A. Pignari and **F. Grassi**, "An alternative approach to radiated susceptibility testing of airborne equipment," in *Proc. APEMC 2010, Asia-Pacific Int. Symp. on Electromagn. Compat.*, Beijing, China, April 12-16, 2010, pp. 560-563, ISBN 978-1-4244-5623-9.
- C29.** **F. Grassi**, S. A. Pignari, J. Wolf, "Assessment of CAN performance for Powerline Communications in dc differential buses," in *Proc. 2009 IEEE Int. Conf. on Microwaves, Communications, Antennas and Electronics Systems, IEEE COMCAS 2009*, Tel Aviv, Israel, Nov. 9-11, 2009, pp. 1-6 (paper no. 2B4, Session "Wireless Network").
- C30.** **F. Grassi**, "Accurate modeling of ferrite-core effects in probes for Bulk Current Injection," in *Proc. 2009 IEEE Int. Conf. on Microwaves, Communications, Antennas and Electronics Systems, IEEE COMCAS 2009*, Tel Aviv, Israel, Nov. 9-11, 2009, pp. 1-6 (paper no. 1E3, Session "EMC Materials and Models").
- C31.** **F. Grassi**, J. Wolf, "EMC issues related to the application of the PLC technology on spacecraft power buses," in *Proc. 2009 ESA Workshop on Aerospace EMC*, Firenze, Italy, March 30 - April 1, 2009, Session 10, Paper 1, pp. 1-6.
- C32.** **F. Grassi**, F. Marliani, and S. A. Pignari, "SPICE modeling of BCI probes accounting for the frequency-dependent behavior of the ferrite core," in *Proc. XIXth General Assembly of International Union of Radio Science (U.R.S.I.)*, Chicago, IL, USA, Aug. 7-16, 2008, Commission E, Paper E07.6.
- With this paper, she was awarded the URSI Young Scientist Award (XXIXth URSI G.A., Chicago, IL, USA, Aug. 2008).*
- C33.** **F. Grassi**, G. Spadacini, F. Marliani, and S. A. Pignari, "Vertical illumination in radiated susceptibility tests: Reconstruction of EMI effects on shielded cables," in *Proc. IEEE Symp. on Embedded EMC, 2emc, ESIGELEC*, Rouen, France, Oct. 18-19, 2007, Paper 1B. (CD-ROM).
- C34.** **F. Grassi** and S. A. Pignari, "Data-Transmission characteristics of power cables with star-quad cross-section," in *Proc. IEEE Int. Symp. on Powerline Communications and its Applications, ISPLC 2007*, Pisa, Italy, March 26-28, 2007, pp. 401-406. ISBN 1-4244-1090-8.

- C35. L. Di Rienzo, **F. Grassi**, and S. A. Pignari, "FIT modelling of injection probes for bulk current injection," in *Proc. 23rd Annual Review of Progress in Applied Computational Electromagnetics, ACES 2007*, Verona, Italy, March 19-23, 2007, pp. 782-787.
- C36. **F. Grassi**, G. Spadacini, F. Marliani, and S. A. Pignari, "The use of FEKO in EMI modelling of the test set-up for radiated immunity," in *Proc. 23rd Annual Review of Progress in Applied Computational Electromagnetics, ACES 2007*, Verona, Italy, March 19-23, 2007, pp. 279-284.
- C37. S. A. Pignari, **F. Grassi**, F. Marliani, F. G. Canavero, "Experimental characterization of injection probe for bulk current injection," in *Proc. XXVIIIth General Assembly of International Union of Radio Science (U.R.S.I.)*, New Delhi, India, Oct. 23-29, 2005, Commission EA, Paper EA.4-494. (CD-ROM)
- C38. **F. Grassi**, S. A. Pignari, and F. G. Canavero, "Fixture for modeling and calibration of bulk current injection probes," in *Proc. IEEE Symp. on Embedded EMC, 2emc, ESIGEELEC*, Rouen, France, Sept. 26-28, 2005, Paper 5B. (CD-ROM)
- C39. **F. Grassi**, S. A. Pignari, and F. Marliani, "Lumped-Pi circuit model for bulk current injection probes," in *Proc. 2005 IEEE Symposium on Electromagn. Compat.*, Chicago, IL, USA, Aug. 8-12, 2005, pp. 451-456.
- C40. **F. Grassi** and S. A. Pignari, "Conducted emissions analysis in four-conductor systems with long feeders," in *Proc. EMC Europe 2004, Int. Symp. on Electromagn. Compat.*, Eindhoven, The Netherlands, Sept. 6-10, 2004, pp. 576-581.
- C41. C. M. Arturi, A. Gandelli, **F. Grassi**, "Electromagnetic compatibility of PCB-based coreless transformers," in *Proc. PIERS 2003, Progress in Electromagnetics Research Symposium*, Honolulu, Hawaii, USA, Oct. 13-16, 2003, (CD-ROM), abstract pag. 558.
- C42. C. M. Arturi, A. P. Mondini, **F. Grassi**, "TRANSFO-IRS: An impulse response simulator for large power transformers," in *Proc. ICEM 2002, 15th International Conference on Electrical Machines*, Brugge, Belgium, August 25-28, 2002 (CD-ROM), abstract pag. 151.
- C43. C. M. Arturi, A. Gandelli, **F. Grassi**, "High frequency model of printed-circuit-board based three-winding transformers," in *Proc. 2002 45th IEEE Midwest Symposium on Circuits and Systems, MWSCAS-2002*, Tulsa, Oklahoma, USA, August 4-7, 2002, pp. 395-399.

Technical but not Research-Related Papers

- T1. **F. Grassi**, S. A. Pignari, G. Spadacini, "It's a Dynamo, as designed by Edison," *IEEE EMC Newsletter*, Issue 223, Fall 2009, pp. 103-104.

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Flavia Grassi