Dipl.-Ing. Dr. techn. Christian Kral
Meravigliagasse 2/5
1060 Wien

Persönliche Daten

Name	Dipl.-Ing. Dr. techn. Christian Kral
Geburtsdatum	27.10.1968
Geburtsort	St. Pölten
Adresse	Meravigliagasse 2/5 1060 Wien
e-mail	christian@christiankral.net
Webpage	https://christiankral.net
Github	https://github.com/christiankral
Staatsbürgerschaft	Österreich

Ausbildung

09/1983–06/1988	Höhere Technische Lehr- und Versuchsanstalt St. Pölten, Fachrichtung Elektrotechnik
09/1988–02/1997	Studium an der TU Wien, Studienrichtung Energietechnik
05/1996–02/1997	Diplomarbeit am Institut für elektrische Antriebe und Maschinen der TU Wien, unter Anleitung Em. O. Prof. Dr. Hans Kleinrath, Titel »Modellbildung und Simulation des Betriebsverhaltens einer umrichtergespeisten Asynchronmaschine mit defektem Rotorstab«
06/1997–06/1999	Dissertation am Institut für elektrische Antriebe und Maschinen der TU Wien, unter Anleitung von Em. O. Prof. Dr. Hans Kleinrath, Titel »Modellbildung und Betriebsverhalten einer Asynchronmaschine mit defektem Rotorstab im Läuferkäfig einschließlich Detektion durch die Vienna Monitoring Method«

Beruflicher Werdegang

07/1997–04/1999	Vertragsassistent am Institut für Elektrische Antriebe und Maschinen der TU Wien sowie Wissenschaftlicher Angestellter am Institut für Elektrische Antriebe und Maschinen der TU Wien (FWF Projekt »Erkennung von Rotorexzentrizitäten bei umrichtergespeisten Asynchronmaschinen mit Hilfe von On-Line-Modellen«)
05/1999–06/2000	Universitätsassistent am Institut für Elektrische Antriebe und Maschinen der TU Wien
09/2000–12/2001 05/2003–08/2013	Wissenschaftlicher Mitarbeiter und Projektleiter beim Österreichischen Forschungs- und Prüfzentrum Arsenal GmbH, Geschäftsfeld Monitoring, Energie- und Antriebstechnik bzw. deren Nachfolgegesellschaft AIT Austrian Institute of Technology GmbH, Geschäftsfeld Electric Drive Technologies
01/2002–04/2003	Visiting Professor am Georgia Institute of Technology, Atlanta, Georgia, USA
2005-2013	Senior Scientist beim Österreichischen Forschungs- und Prüfzentrum Arsenal GmbH bzw. deren Nachfolgegesellschaft AIT Austrian Institute of

	Technology GmbH: strategische Mitwirkung bei der Ausrichtung der Forschungsschwerpunkte, wissenschaftliche und strategische Unterstützung anderer Projektleiter
2008-2013	Teamleiter / Themenkoordinator im Geschäftsfeld Monitoring, Energie- und Antriebstechnik bzw. Electric Drive Technologies des AIT[1]: Organisation der Teams, Strategische Orientierung der Forschungsthemen und Projekte im Team, Aufbau der Regelkommunikation im Team
seit 09/2013	Lehrer in der Abteilung Elektrotechnik am TGM in Wien XX
seit 2014	Lektor am Technikum Wien
seit 2014	Selbständiger Mechatroniker für Elektromaschinenbau und Automatisierung

Projekte und Arbeitsgebiete

1997–2012 Monitoring und Fehlerdetektion bei Asynchronmaschinen einschließlich
- Erkennung von Rotorfehlern
- Erkennung von Statorwicklungsasymmetrien
- Erkennung von Exzentrizitäten und Unwuchten
- Untersuchung von Lagerfehlern auf Basis von elektrischen Messungen

2001 Sicherheit von Tunnelbohrmaschinen

2002–2003 Schätzung der Rotorlage (Drehzahl) bei Anwesenheit von elektrischen Rotorasymmetrien bei Asynchronmaschinen

2002–2004 Thermische Modelle von Asynchronmaschinen und Schätzung von Temperaturen aus gemessenen elektrischen Größen

2003–2004 Mitarbeit am strategischen Forschungsprojekt »Smart Drives for Smart Cars« im Bereich Modellbildung und Simulation elektrischer Maschinen

2004–2006 Projektleiter für die kommerzielle Modelica-Bibliothek »SmartElectricDrives«
- Transiente und quasistationäre Modelle von elektrischen Antrieben von Gleichstrommaschinen, Permanentmagnet-Synchronmaschinen und Asynchronmaschinen
- Transiente und quasistationäre Modelle von Gleichrichtern, DC/DC Konvertern und Umrichtern
- Parameterschätzung für elektrische Maschinen und die Einstellung von Antriebsregelungen

2005–2013 Entwicklung des Workflows für die Auslegung und Simulation von elektrischen Maschinen und Antrieben

2006–2008 Schätzung der Rotorlage aus Nutungseffekten bei Asynchronmaschinen

2006–2013 Projektleiter für die Modelica-Bibliotheken »FundamentalWaves«, »PermanentMagnets« und »HarmonicWaves«
- Drehfeldmaschinen mit beliebiger Phasenzahl im Stator (und Rotor)
- Modellierung beliebiger Asymmetrien der Wicklungen des Stators (und Rotors)
- Berücksichtigung von Stromverdrängung in Maschinen mit (Dämpfer-) Käfig
- Berücksichtigung der Sättigung des Hauptfeldes für Gleichstrom- und Drehfeldmaschinen
- Modellierung von Reibungs-, Eisen- und Zusatzverlusten
- Kopplung mit thermischen Netzwerken
- Modellierung von Demagnetisierungseffekten in Permanentmagnet-Maschinen
- Modellierung von harmonischen Oberwelleneffekten in elektrischen Maschinen

2010–2012 Modellierung und Analyse von Wärmeübergangsphänomenen in elektrischen Maschinen

2011–2013 Projektleiter des A3plus geförderten Projekts "InWeMat" (Innovative Weicheisen Materialen). Thema: Entwicklung von Modellen zur Bestimmung der Eisenverluste in Blechen von elektrischen Maschinen

2011–2013 Initiierung der „Science Talks“ als interne Kommonikationsveranstaltung für den inhaltlich-wissenschaftlichen Austausch von Mitarbeitern

2012–2013 Akquisition des europäischen Förderprojektes von „SyrNemo“ im Rahmen von FP7: (Synchronous Reluctance Next Generation Efficient Motors for Electric Vehicles)

1 Name des AIT vormals: Österreichischen Forschungs- und Prüfzentrum Arsenal GmbH

2013-dato Selbständige Arbeiten im Bereich der Modellbildung und Simulation elektrischer Maschinen und Antriebe

Weiterbildung

04/2003 B. Schönbach, »Flir Trainingskurs Thermographie«, Arsenal Research, Wien
12/2003 D. Gospodaric, Seminar »Simulation Elektrischer Maschinen«, Haus der Technik, München
06/2004 M. Otter (DLR München), Seminar »Multidisziplinäre Modellierung und Simulation mit Modelica 2.1 und Dymola 5.2a«, Arsenal Research, Wien
11/2004 C. Grabner (Siemens), Seminar »Numerische Feldberechnung elektrischer Maschinen, Theorie und Erkenntnisse für die Praxis«, ÖVE, Wien
01/2005 Seminar »Value Based Selling«, International Training & Consulting (ITC), Wien
03/2005 B. Bachmann (FH Bielefeld), Tutorial »Mathematical Aspects of Object-Oriented Modeling and Simulation«, Modelica Conference 2005, Hamburg
06/2005 T. Habetler (Georgia Institute of Technology, Atlanta), Internes Seminar »Writing a Technical Paper«, Arsenal Research, Wien
07/2005 T. Habetler (Georgia Institute of Technology, Atlanta), Internes Seminar »An Introduction to the Use of Artificial Neural Networks and Fuzzy Logic in the Control and Fault Diagnostics of Electrical Machines«, Arsenal Research, Wien
07/2006 K. Reichert (ETH Zürich), Zweitägige FEMAG Schulung »Berechnung der elektromagnetischen Felder von elektrischen Maschinen«, Arsenal Research, Wien
07/2006 C. Sejkora (Seibersdorf Research), Internes Seminar »Statische Analyse – Softwaremetriken«, Arsenal Research, Wien
10/2006 H. Tummescheidt (Modelon, Schweden), »Introduction to Dymola/Modelica and the AirConditioning Library«, Arsenal Research, Wien
11/2007 FEMAG Anwendertag, Stuttgart
12/2008 S. McCarthy (Hyperion, Ireland) »How to write a competitive proposal for Framework 7«
03/2010 D. Baca (AIT), »Informationsveranstaltung rund um Angebot, Preisfindung, Projekteröffnung, Kostenkontrolle, Rechnungslegung«
01/2014 W. Haager (HTL St. Pölten, PH NÖ), »Computeralgebra mit Maxima: Grundlagen und Programmierung«
2014-2015 Mag. Eva Poisel (PH Wien), »Lehrgang Content Language Integrated Learning (CLIL)«

Publikationen

Buch

[1] Christian Kral, »Modelica - Objektorientierte Modellbildung von Drehfeldmaschinen: Theorie und Praxis für Elektrotechniker mit Tutorial für GitHub«, Hanser Verlag München 2018, 347 Seiten, ISBN 978-3-446-45551-1

Publikationen in Peer Reviewed Zeitschriften

[2] R. Wieser, C. Kral, F. Pirker, M. Schagginger, »On-Line Rotor Cage Monitoring of Inverter-Fed Induction Machines by Means of an Improved Method«, IEEE Transactions on Power Electronics, vol. 14, no. 5, pp. 858–865, September 1999.

[3] C. Kral, F. Pirker, G. Pascoli, »Erkennung defekter Rotorstäbe an umrichter- und netzgespeisten Asynchronmaschinen durch die Vienna Monitoring Method«, e&i, 117. Jg. (H.2), pp. 119–123, Februar 2000.

[4] C. Kral, R. Wieser, F. Pirker, M. Schagginger, »Sequences of Field-Oriented Control for the Detection of Faulty Rotor Bars in Induction Machines–The Vienna Monitoring Method«, IEEE Transactions on Industrial Electronics, vol. 47, no. 5, pp. 1042–1050, October 2000.

[5] G. Pascoli, F. Pirker, C. Kral, K. May, »Kostensenkung durch Teilentladungs-Monitoring in Mittelspannungsanlagen: Technik – Einsatz – Wirtschaftlichkeit« , e&i, 117 (H12), pp. 788–792, December 2000.

[6] C. Kral, F. Pirker, G. Pascoli, »Erkennung von Rotorfehlern in umrichtergespeisten Asynchronmaschinen«, eb–Elektrische Bahnen, pp. 119-122, Oldenbourg Verlag, 4/2002.

[7] C. Kral, F. Pirker, G. Pascoli, »Detection of Rotor Faults in Squirrel Cage Induction Machines at Standstill for Batch Test by Means of the Vienna Monitoring Method«, IEEE Transactions on Industry Applications, Vol 38, No. 3, pp. 618-624, May/June 2002.

[8] C. Kral, T.G. Habetler, R.G. Harley, »Detection of Mechanical Imbalances of Induction Machines Without Spectral Analysis of Time-Domain Signals«, IEEE Transactions on Industry Applications, vol. 40, no. 4, pp. 1101–1105, July/August 2004.

[9] C. Kral, T.G. Habetler, R.G. Harley, F. Pirker, G. Pascoli, H. Oberguggenberger, C.-J.M. Fenz, »Rotor Temperature Estimation of Squirrel-Cage Induction Motors by Means of a Combined Scheme of Parameter Estimation and a Thermal Equivalent Model«, IEEE Transactions on Industry Applications, vol. 40, no. 4, pp. 1049–1057, July/August 2004.

[10] C. Kral, A. Haumer, H. Kapeller, F. Pirker, »Design and thermal simulation of induction machines for traction in electric and hybrid electric vehicles«, WEVA Journal, Vol. 1, pp. 190–196, May 2007.

[11] C. Kral, H. Kapeller, F. Pirker, »A stator and rotor fault detection technique for induction machines in traction applications of electric or hybrid electric vehicles«, WEVA Journal, Vol. 1, pp. 184–189, May 2007.

[12] C. Kral, F. Pirker, H. Kapeller, G. Pascoli, »Robust Rotor Fault Detection by Means of the Vienna Monitoring Method and a Parameter Tracking Technique«, accepted on April 03, 2008 for publication in the IEEE Transactions on Industrial Electronics.

[13] C. Kral, A. Haumer, H. Kapeller, G. Pascoli, »Modeling and Simulation of a Large Chipper Drive«, accepted for publication in The Open Electrical & Electronic Engineering Journal, Bentham Science Publishers, 2008.

[14] C. Kral, F. Pirker, G. Pascoli, »The Impact of Inertia on Rotor Fault Effects - Theoretical Aspects of the Vienna Monitoring Method«, accepted on February 06, 2008 for publication in the IEEE Transactions on Power Electronics.

[15] C. Kral, A. Haumer, T. Bäuml, »Thermal Model and Behavior of a Totally Enclosed Water Cooled Squirrel Cage Induction Machine for Traction Applications«, accepted on May 19, 2008 for publication in the IEEE Transactions on Industrial Electronics.

[16] C. Kral, A. Haumer, H. Kapeller, G. Pascoli, »Modeling and Simulation of a Large Chipper Drive«, Open Electrical & Electronic Engineering Journal, Bentham Science Publishers, 2009

[17] C. Kral, A. Haumer, M. Haigis, H. Lang, H. Kapeller, ”Comparison of a CFD Analysis and a Thermal Equivalent Circuit of a TEFC Induction Machine with Measurements”, accepted for publication in the IEEE Transactions of Energy Conversion”, 2009

[18] C. Grabner, J.V. Gragger, H. Kapeller, A. Haumer and C. Kral, „Design Guidelines for Sensorless PM-Drives“, IAENG Engineering Letters, Volume 17, Issue 4, ISSN 1816-0948, November 2009

[19] C. Kral, A. Haumer, and C. Grabner, “Consistent Induction Motor Parameters for the Calculation of Partial Load Efficiencies by Means of an Advanced Simulation Model”, IAENG Engineering Letters, Volume 18, Issue 1, ISSN 1816-0948, January 2010

[20] Christian Kral, Johannes Gragger, Hansjörg Kapeller, Anton Haumer, Bernhard Kubicek, “Phenomenon Rotor Fault – Multiple Electrical Rotor Asymmetries in Induction Machines”, IEEE Transactions on Power Electronics, Vol. 25, No. 5, pp. 1124-1134 (DOI 10.1109/TPEL.2009.2037502) May 2010

[21] C. Kral, D. Simic, “Simulation von Elektrofahrzeugen”, Elektrotechnik & Informationstechnik, e&i, 128/1-2, 2011, S. 28-35

[22] Markus Einhorn, Wolfgang Guertlschmid, Thomas Blochberger, Rupert Kumpusch, Robert Permann, Valerio Conte, Christian Kral, Juergen Fleig, “A Current Equalization Method for Serially Connected Battery Cells Using a Single Power Converter for Each Cell”, IEEE Transactions on Vehicular Technology, vol. 60, no. 9, 2011, pp. 4227-4237

[23] M. Einhorn, V. Conte, C. Kral, J. Fleig, “A Method for Online Capacity Estimation of Lithium Ion Battery Cells Using the State of Charge and the Transferred Charge”, IEEE Transactions on Industry Applications, vol. 48, no. 2, 2012, pp. 736-741, 2011

[24] Jongman Hong, Sang Bin Lee, Christian Kral, and Anton Haumer, “Detection of Airgap Eccentricity for Permanent Magnet Synchronous Motors based on the d-axis Inductance”, IEEE Transactions on Power Electronics, vol. 25, no. 5, pp. 2605-2612, May 2012

[25] J. Antonino-Daviu, M. Riera-Guasp, J. Pons-Llinares, J. Park, S. Bin Lee, J. Yoo, C. Kral, "Detection of Broken Outer-Cage Bars for Double-Cage Induction Motors Under the Startup Transient", IEEE Transactions on Industry Applications, Nr. 4 , Vol. 48 , September/Oktober 2012 , ISSN 0093-9994; pp. 1539-1548.

[26] H. Jongman, P. Sanguk, H. Doosoo, K. Tae-June, S. Bin Lee, C. Kral, A. Haumer: "Detection and Classification of Rotor Demagnetization and Eccentricity Faults for PM Synchronous Motors", IEEE Transactions on Industry Applications, Volume 48, Issue 3, May-June, 2012, ISSN 0093-9994; pp. 923 - 932.

[27] C. Jungreuthmayer, T. Bäuml, O. Winter, M. Ganchev, H. Kapeller, A. Haumer, C. Kral, "A Detailed Heat and Fluid Flow Analysis of an Internal Permanent Magnet Synchronous Machine by Means of Computational Fluid Dynamics", IEEE Transactions On Industrial Electronics, Vol. 59, No. 12, December 2012 (2012), 0278-0046, pp. 4568 - 4578

[28] O. Winter, C. Kral, E. Schmidt, "Augmented Temperature Degrading Effect of Rare Earth Magnets Arranged in Segmented Halbach Arrays", IEEE Transactions on Magnetics, Vol. 48, No. 11, pp. 3335-3338, 2012

[29] M. Einhorn, F.-V. Conte, C. Kral, J. Fleig, "Comparison, Selection, and Parameterization of Electrical Battery Models for Automotive Applications"; IEEE Transactions On Power Electronics,, Vol. 28, No. 3, March 2013, pp. 1429 – 1437.

[30] Christian Kral, Sang Bin Lee, Anton Haumer, „A Practical Thermal Model for the Estimation of Permanent Magnet and Stator Winding Temperatures“, aktzeptiert zur Publikation in: IEEE Transactions On Power Electronics, 2013

[31] Ganchev, M.; Kral, C. & Wolbank, T. (2013), 'Compensation of Speed Dependence in Sensorless Rotor Temperature Estimation for Permanent-Magnet Synchronous Motor', *Industry Applications, IEEE Transactions on* **49**(6), 2487-2495.

[32] Hong, J.; Hyun, D.; Lee, S. B. & Kral, C. (2013), 'Offline Monitoring of Airgap Eccentricity for Inverter-Fed Induction Motors Based on the Differential Inductance', *IEEE Transactions on Industry Applications* **49**(6), 2533-2542.

[33] Kral, C.; Haumer, A. & Lee, S. B. (2014), 'A Practical Thermal Model for the Estimation of Permanent Magnet and Stator Winding Temperatures', *IEEE*

Transactions on Power Electronics **29**(1), 455-464.

Publikationen auf Konferenzen

[34] R. Wieser, C. Kral, F. Pirker, M. Schagginger, »Condition Monitoring of Inverter Fed Induction Machines by Means of State Variable Observation«, Conference Proceedings of International Conference on Electrical Machines, EMD, pp. 336–340, 1997.

[35] R. Wieser, C. Kral, F. Pirker, M. Schagginger, »On-line Rotor Cage Monitoring of Inverter Fed Induction Machines: Experimental Results«, Conference Proceedings of the First International IEEE Symposium on Diagnostics of Electrical Machines, Power Electronics and Drives, SDEMPED, pp. 15–22, 1997.

[36] R. Wieser, C. Kral, F. Pirker, M. Schagginger, »Rotor Fault Detection of Inverter Fed Induction Machines including Experimental Results«, Conference Proceedings of the European Conference on Power Electronics and Applications, EPE, pp. 2.532–2.538, 1997.

[37] C. Kral , R. Wieser, F. Pirker, M. Schagginger, »The Vienna Induction Machine Monitoring Method; A Structural Analysis of a Faulty Machine Behavior at a Stiff Voltage Supply«, Power Electronics, Automation, Motion, Drives and Control, Power Quality, PCIM, pp. 425–432, 1998.

[38] R. Wieser, C. Kral, F. Pirker, M. Schagginger, »Sensitive Rotor Cage Monitoring without Frequency Analysis, the Vienna Method«, Symposium on Power Electronics Electrical Drives Advanced Machines Power Quality, speedam, pp. P321–P326, 1998.

[39] C. Kral, R. Wieser, F. Pirker, M. Schagginger, »Sequences of Field Oriented Control for the Detection of Faulty Rotor Bars in Induction Machines – The Vienna Monitoring Method«, 5th International Workshop on Advanced Motion Control, AMC, pp. 463–468, 1998.

[40] R. Wieser, C. Kral, F. Pirker, M. Schagginger, »The Vienna Induction Machine Monitoring Method; On the Impact of Field Oriented Control Structure on Real Operational Behavior of a Faulty Machine«, 24th Annual Conference of the IEEE Industrial Electronics Society, IECON, pp. 1544–1549, 1998.

[41] R. Wieser, C. Kral, F. Pirker, M. Schagginger, »High Sensitive Rotor Cage Monitoring During Dynamic Load Operation, the Vienna Method«, International Conference on Electrical Machines ICEM'98, pp. 432–437, 1998.

[42] R. Wieser, C. Kral, F. Pirker, M. Schagginger, »Robust Induction Machine Cage Monitoring Technique for Highly Distorted Voltage and Current, Waveforms, the Vienna Method«, Seventh International Conference on Power Electronics and Variable Speed Drives, IEE PEVD, 1998.

[43] R. Wieser, M. Schagginger, C. Kral, F. Pirker, »The Integration of Machine Fault Detection into an Indirect Field Oriented Induction Machine Drive Control Scheme The Vienna Monitoring Method«, IEEE Industry Applications Society 33rd Annual Meeting, 1998.

[44] C. Kral, »The Behavior of an Inverter Fed Squirrel Cage Induction Machine with Faulty Rotor Bars«, Proceedings of the Power Conversion & Intelligent Motion International Conference, PCIM, 1999.

[45] C. Kral, »Derivation of the Space Phasor Equations and the Required Parameters of a Squirrel Cage Induction Machine with a Faulty Rotor Bar«, Proceedings of the IEEE International Symposium on Diagnostics for Electrical Machines, Power Electronics and Drives, SDEMPED, pp. 395–400, 1999.

[46] C. Kral, F. Pirker, »Rotor Eccentricity Detection of Induction Machines by Means of Torque Estimation«, Proceedings of the IEEE International Symposium on Diagnostics for Electrical Machines, Power Electronics and Drives, SDEMPED, pp. 283–287, 1999.

[47] C. Kral, F. Pirker, G. Pascoli, H. Oberguggenberger, »On the Sensitivity of Induction Machine Rotor Cage Monitoring – The Vienna Monitoring Method«, Conference Proceedings of the symposium on Power Electronics, Electrical Drives, Automotion and Drives, speedam, pp. B1/13–B1/18, 2000.

[48] C. Kral, F. Pirker, G. Pascoli, »Detection of Rotor Faults in Squirrel Cage Induction Machines at Standstill for Batch Tests by Means of the Vienna Monitoring Method«, Conference Record of the IEEE Industry Applications Conference, IAS, 2000.

[49] C. Kral, F. Pirker, »Vienna Monitoring Method — Detection of Faulty Rotor Bars by Means of a Portable Measurement System«, Proceedings of the International Conference on Electrical Machines, IECM, pp. 873–877, 2000.

[50] C. Kral, F. Pirker, G. Pascoli, »Rotor Asymmetry Monitoring for Slip-Ring and Squirrel Cage Induction Machines by Means of the Vienna Monitoring Method«, Proceedings of the Conference for Power Electronics, Power Quality and Intelligent Motion, PCIM, pp. 223–228, 2000

[51] C. Kral, F. Pirker, G. Pascoli, W. Berghold, »A Labview Based Rotor Fault Diagnostics Tool for Inverter Fed Induction Machines by Means of the Vienna Monitoring Method at Variable Speed«, Proceedings of the IEEE international power electronics congress, CIEP, pp. 324–329, 2000.

[52] C. Kral. K. Kafka, »Power Electronics Monitoring for a Controlled Voltage Source Inverter Drive with Induction Machines«, Proceedings of the Power Electronics Specialists Conference, PESC, pp. B113–B118, 2000

[53] C. Kral, F. Pirker, G. Pascoli, »Detection of Rotor Faults in Inverter Fed Induction Machines by Means of the Vienna Monitoring Method—A Proposed Application for Traction Drives«, Conference Proceedings of the First International Conference on Railway Traction Systems, RTS, vol. 3, pp. 79–89, 2001.

[54] C. Kral, F. Pirker, G. Pascoli, »Influence of Load Torque on Rotor Asymmetry Effects in Squirrel Cage Induction Machines Including Detection by Means of the Vienna Monitoring Method«, Conference Proceedings EPE, August 2001.

[55] C. Kral, F. Pirker, G. Pascoli, »Rotor Eccentricity Detection of Induction Machines by Means of Torque Estimation—Measurement Results«, Conference Proceedings of the Third International IEEE Symposium on Diagnostics of Electrical Machines, Power Electronics and Drives, SDEMPED, pp. 641–644, September 2001.

[56] C. Kral, F. Pirker, G. Pascoli, »Influence of Inertia on General Effects of Faulty Rotor Bars and the Vienna Monitoring Method«, Conference Proceedings of the Third International IEEE Symposium on Diagnostics of Electrical Machines, Power Electronics and Drives, SDEMPED, pp. 447–452, September 2001.

[57] C. Kral, F. Pirker, G. Pascoli, H. Oberguggenberger, »Influence of rotor cage design on rotor fault detection by means of the Vienna Monitoring Method«, ICEM 2002, 15th International Conference on Electrical Machines, Brügge, Paper No. 328, 25-28 August 2002.

[58] C. Kral, F. Pirker, G. Pascoli, E. Wiedenbrug, »Application of Space Phasors for the Discrimination of Short-Circuits and High Inertia Startups«, 2002 IEEE Industry Applications Conference, 37th IAS Annual Meeting, Pittsburgh, October 2002.

[59] C. Kral, F. Pirker, G. Pascoli, »Rotor Eccentricity Detection of Two Pole, Two Phase Squirrel Cage Induction Motors«, Symposium on Power Electronics, Electrical Drives, Automation and Motion, speedam, pp. B1/1–B1/5, 2002.

[60] F. Pirker, G. Brauner, C. Kral, G. Pascoli, »Sicherer Umgang mit elektrischen Anlagen«, Proceedings VDE/ETG-Fachtagung ICOLIM 2002, 6. Internationale Konferenz über »Arbeiten unter Spannung«, Paper no. A5/3, Berlin, 5. - 7. Juni 2002.

[61] C. Kral, T.G. Habetler, R.G. Harley, F. Pirker, G. Pascoli, H. Oberguggenberger, C.J.M. Fenz, »Rotor temperature estimation of squirrel cage induction motors by means of a combined scheme of parameter estimation and a thermal equivalent model«, IEEE International Electric Machines and Drives Conference, IEMDC, 2003.

[62] C. Kral, T.G. Habetler, R.G. Harley, »Detection of Mechanical Imbalances without Frequency Analysis«, 4th IEEE International Symposium on Diagnostics for Electric Machines, Power Electronics and Drives, SDEMPED, pp. 317–321, 2003.

[63] C. Kral, T.G. Habetler, R.G. Harley, F. Pirker, G. Pascoli, H. Oberguggenberger,

C.J.M. Fenz, »A Comparison of Rotor Fault Detection Techniques with Respect to the Assessment of Fault Severity«, 4th IEEE International Symposium on Diagnostics for Electric Machines, Power Electronics and Drives, SDEMPED, pp. 265–270, 2003.

[64] C. Kral, F. Pirker, G. Pascoli, »Model Based Detection of Rotor Faults without Rotor Position Sensor—the Sensorless Vienna Monitoring Method«, 4th IEEE International Symposium on Diagnostics for Electric Machines, Power Electronics and Drives, SDEMPED, pp. 253–258, 2003.

[65] G. Pascoli, C. Kral, F. Pirker, N. Pokorny, »Experiences with Online Partial Discharge Diagnoses on Turbogenerators«, 4th IEEE International Symposium on Diagnostics for Electric Machines, Power Electronics and Drives, SDEMPED, pp. 20–24, 2003.

[66] C. Kral, F. Pirker, G. Pascoli, C.-J.M. Fenz, »Influence of Load Torque on the Detection of Rotor Faults by Means of the Sensorless Vienna Monitoring Method«, Conference Proceedings of the Second IEE International Conference on Power Electronics, Machines and Drives, PEMD, pp. 108-113, 2004.

[67] C. Kral, F. Pirker, A. Haumer, M. Haigis, G. Pascoli, »Comparison of a Thermal CFD and a Thermal Equivalent Circuit Model of a Squirrel Cage Induction Machine«, International Aegean Conference on Electrical Machines and Power Electronics, ACEMP, pp. 426-430, 2004.

[68] C.-J. Fenz, G. Brauner, C. Kral, F.A. Himmelstoss, »Hybrid Switching of High Currents in the Vicinity of the Zero Crossing of the Supply Voltage«, Proceedings of the 9th international conference on optimization of electrical and electronic equipments, OPTIM, vol. I, pp. 199-204, 2004.

[69] M. Plainer, C. Kral, G. Singer, »Investigation of the Longitudinal Dynamic Effects Before and After the Derailment of a Freight Train«, Conference Proceedings, ASME 2004.

[70] H. Oberguggenberger, C. Kral, »A FPGA based Rotor Fault Diagnostic Tool for Squirrel Cage Induction Machines by Means of the Vienna Monitoring Method«, Power Electronics, Intelligent Motion and Power Quality, PCIM 2004.

[71] C. Kral, C.-J. Fenz, M. Plainer, F. Pirker, G. Pascoli, »Mechanical imbalances – test bed, measurement, detection technique«, International Conference on Electrical Machines ICEM, 2004.

[72] C.-J. Fenz, G. Brauner, C. Faltin, C. Kral, F.A. Himmelstoss, »A Hybrid Synchronous High Current Switching Device«, International Power Electronics and Motion Control Conference, EPE-PEMC, 2004.

[73] C. Kral, A. Haumer, M. Plainer, »Simulation of a thermal model of a surface cooled squirrel cage induction machine by means of the SimpleFlow-library«, Modelica 2005 Conference, pp. 213–218, 2005

[74] C. Kral, A. Haumer, »Modelica libraries for dc machines, three phase and polyphase machines«, Modelica 2005 Conference, pp. 549–558, 2005.

[75] C. Kral, F. Pirker, G. Pascoli, »Model-Based Detection of Rotor Faults Without Rotor Position Sensor – The Sensorless Vienna Monitoring Method«, IEEE Transactions on Industry Applications, vol. 41, no. 3, pp. 784-789, May-June 2005.

[76] C. Kral, A. Haumer, H. Kapeller, F. Pirker, G. Pascoli, C.-J.M. Fenz, »Comparison of two rotor temperature estimation models of a surface cooled squirrel cage induction machine«, International Electric Machines and Drives Conference, IEMDC, 2005.

[77] C. Kral, H. Kapeller, F. Pirker, G. Pascoli, C.-J.M. Fenz, »Discrimination of rotor faults and low frequency load torque modulations of squirrel cage induction machines by means of the Vienna Monitoring Method«, Power Electronics Specialists Conference, PESC, 2005.

[78] C. Kral, H. Kapeller, F. Pirker, G. Pascoli, »Detection of Rotor Faults under Transient Operating Conditions by Means of the Vienna Monitoring Method«, IEEE International Symposium on Diagnostics on Electric Machines, Power Electronics and Drives, SDEMPED, 2005.

[79] C. Kral, H. Kapeller, J. Gragger, F. Pirker, G. Pascoli, »Detection of mechanical imbalances during transient torque operating conditions«, IEEE International Symposium on Diagnostics on Electric Machines, Power Electronics and Drives, SDEMPED, 2005.

[80] H. Kapeller, C. Kral, F. Pirker, G. Pascoli, »Stator Winding Turn Fault Detection for Induction Machines«, IEEE International Symposium on Diagnostics on Electric Machines, Power Electronics and Drives, SDEMPED, 2005.

[81] G. Ujvari, G. Pascoli, C. Kral, C. Kollmitzer, “Partial Discharge Pattern Recognition Algorithm for Turbo Generator“, IEEE International Symposium on Diagnostics on Electric Machines, Power Electronics and Drives, SDEMPED, 2005.

[82] D. Simic, C. Kral, F. Pirker, »Simulation of the Cooling Circuit with an Electrically Operated Water Pump«, IEEE Vehicle Power and Propulsion Conference, VPPC, 2005.

[83] H. Giuliani, C. Kral, J.V. Gragger, »Modelica Simulation of Electric Drives for Vehicular Applications – The Smart Drives Library«, 18th Symposium on Simulation Technique, ASIM, 2005.

[84] S. Rajagopalan, T.G. Habetler, C. Kral, F. Pirker, »Monitoring and Diagnostics for Electric Drivetrain Components in HEVs«, SAE World Congress 2006.

[85] D. Simic, H. Giuliani, C. Kral, F. Pirker, »Simulation of Conventional and Hybrid Vehicle including Auxiliaries with Respect to Fuel Consumption and Exhaust Emissions«, SAE World Congress 2006.

[86] C. Kral, J.V. Gragger, F. Pirker, G. Pascoli, »Sensorless Rotor Position Estimation through Current Signature Analysis Based on Rotor Saliency Harmonics«, International Symposium on Power Electronics, Electrical Drives, Automation and Motion, SPEEDAM, 2006.

[87] C. Kral, A. Haumer, H. Kapeller, F. Pirker, »Design and thermal simulation of induction machines for traction in electric and hybrid electric vehicles«, The 22nd International Battery, Hybrid and Fuel Cell Electric Vehicle Symposium & Exposition, EVS22, 2006.

[88] C. Kral, H. Kapeller, F. Pirker, »A stator and rotor fault detection technique for induction machines in traction applications of electric or hybrid electric vehicles«, The 22nd International Battery, Hybrid and Fuel Cell Electric Vehicle Symposium & Exposition, EVS22, 2006.

[89] H. Giuliani, J.V. Gragger, D. Simic, C. Kral, »Optimization of a Four Wheel Drive Hybrid Electric Vehicle by Means of the Smart Electric Drives and the Smart Power Train Library«, The 22nd International Battery, Hybrid and Fuel Cell Electric Vehicle Symposium & Exposition, EVS22, 2006.

[90] H. Lang, C. Kral, A. Haumer, M. Haigis, R. Schulz, »Investigation of the Thermal Behavior of a Salient Pole Synchronous Machine«, XVII International Conference on Electrical Machines ICEM 2006

[91] C. Kral, A. Haumer, M. Haigis, H. Lang, H. Kapeller, »Comparison of Measurements with a CFD Analysis and a Thermal Equivalent Circuit Model of a TEFC Induction Machine«, XVII International Conference on Electrical Machines ICEM 2006.

[92] D. Simic, H. Giuliani, J. Gragger, C. Kral, »Simulation of Hybrid Electric Vehicles«, 5th International Modelica Conference, 2006

[93] M. Dempsey, H. Elmqvis, M. Gaefvert, P. Harman, C. Kral, M. Otter, P. Treffinger, »Coordinated automotive library for vehicle system modelling«, 5th International Modelica Conference, 2006

[94] J.V. Gragger, H. Giuliani, C. Kral, T. Bäuml,, H. Kapeller, F. Pirker, »The SmartElectricDrives Library -- Powerful Models for Fast Simulations of Electric Drives«, 5th International Modelica Conference, 2006.

[95] U. Reisenbichler, H. Kapeller, A. Haumer, C. Kral, F. Pirker, G. Pascoli, »If we only had used XML...«, 5th International Modelica Conference, 2006

[96] H. Kapeller, A. Haumer, C. Kral, F. Pirker, G. Pascoli, »Identification and controls of electrically excited synchronous machines«, 5th International Modelica

Conference, 2006.

[97] R. Schimon, D. Simic, A. Haumer, C. Kral, M. Plainer, »Simulation of Components of a Thermal Power Plant«, 5th International Modelica Conference, 2006.

[98] D. Simic, C. Kral, H. Lacher, »Optimization of a Cooling Circuit with a Parameterized Water Pump Model«, 5th International Modelica Conference, 2006.

[99] G. Pascoli, G.Ujvari, W. Hribernik, C. Kral, »Implementation of an intelligent pattern recognition algorithm for the condition assessment of generator insulation systems«, International Conference on Condition Monitoring and Diagnosis, CMD, 2006.

[100] J. Gragger, C. Kral, H. Giuliani, D. Simic, »A Simulation Tool for Electric Auxiliary Drives in HEVs - the Smart Electric Drives Library«, FISITA 2006

[101] T. Bauml, C. Kral, A. Haumer, H. Kapeller, »Enhanced Thermal Model of a Totally Enclosed FanCooled Squirrel Cage Induction Machine«, IEMD 2007

[102] C. Kral, F. Pirker, G. Pascoli, »The Impact of Inertia on Rotor Faults Effects – Theoretical Aspects of the Vienna Monitoring Method«, Conference Proceedings of the International IEEE Symposium on Diagnostics of Electrical Machines, Power Electronics and Drives, SDEMPED,2007

[103] C. Kral, A. Haumer, F. Pirker, »A Modelica Library for the Simulation of Electrical AsymmetriesIn Multiphase Machines – The ExtendedMachines Library«, Conference Proceedings of the International IEEE Symposium on Diagnostics of Electrical Machines, Power Electronics and Drives, SDEMPED,2007

[104] T. Bäuml , C. Kral, H. Kapeller, H. Neudorfer, »Thermal Design, Simulations and Measurements of a High Performance Double Air Cooled Traction Machine«, RTS, 2007

[105] H. Lang, M. Haigis, C. Kral, A. Haumer, H. Kapeller, H. Neudorfer, F. Dangl, W. Sollinger, »Thermal investigation of rotating electrical machinery«, NAFEMS Congress, 2007

[106] H. Neudorfer, F. Dangl, M. Dallinger, W. Sollinger, H. Lang, H. Kapeller, C. Kral, T. Bäuml, »Entwicklung und messtechnische Verifizierung eines Traktionsgenerators in der Leistungsklasse von 1,2 MW«, ETG Kongress des VDE, Kundennutzen durch neue Technologien in der Bahntechnik, Karlsruhe, 23.-24. Oktober 2007

[107] J. V Gragger, A. Haumer, C. Kral, F. Pirker, “Efficient Analysis of Harmonic Losses in PWM Voltage Source Induction Machine Drives with Modelica”, International Modelica Conference, 6th, Bielefeld, Germany, 2008

[108] C. Kral, A. Haumer, »Simulation of Electrical Rotor Asymmetries in Squirrel Cage Induction Machines with the ExtendedMachines Library«, International Modelica Conference, 6th, Bielefeld, Germany, 2008

[109] A. Haumer, C. Kral, J.V. Gragger, H. Kapeller, »Quasi-Stationary Modeling and Simulation of Electrical Circuits using Complex Phasors«, International Modelica Conference, 6th, Bielefeld, Germany, 2008

[110] H. Kapeller, A. Haumer, C. Kral, G. Pascoli, F. Pirker, »Modeling and Simulation of a Large Chipper Drive«, International Modelica Conference, 6th, Bielefeld, Germany, 2008

[111] C. Kral, A. Haumer, »Consistent Equivalent Circuit Parameters of Induction Motors for the Calculation of Partial Load Efficiencies«, IEEE International Symposium on Industrial Electronics, ISIE, 2008

[112] H. Kapeller, A. Haumer, C. Kral, C. Grabner, ” Investigation of the Operational Behavior of a Large Chipper Drive”, International Conference of Electrical and Electronics Engineering, ICEEE at World Congress of Engineering, London, U.K., 1-3 July 2009

[113] C. Kral, A. Haumer, C. Grabner, “Consistent Induction Motor Parameters for the Calculation of Partial Load Efficiencies”, International Conference of Electrical and Electronics Engineering, ICEEE at World Congress of Engineering, London, U.K., 1-3 July 2009

[114] C. Kral, A. Haumer, C. Grabner, “Modeling and Simulation of Broken Rotor Bars

in Squirrel Cage Induction Machines", International Conference of Electrical and Electronics Engineering, ICEEE at World Congress of Engineering, London, U.K., 1-3 July 2009

[115] C. Grabner, J.V. Gragger, H. Kapeller, A. Haumer, C. Kral , "Sensorless Permanent Magnet Drive Design", International Conference of Electrical and Electronics Engineering, ICEEE at World Congress of Engineering, London, U.K., 1-3 July 2009

[116] C. Kral, A. Haumer, B. Kubicek, O. Winter, "Model of a Squirrel Cage Induction Machine with Interbar Conductances", Modelica Conference, 2009

[117] A. Haumer, C. Kral, H. Kapeller, T. Bäuml, J.V. Gragger, "The AdvancedMachines Library: Loss Models for Electric Machines", Modelica Conference, 2009

[118] C. Kral, H. Kapeller, J.V. Gragger, A. Haumer, B. Kubicek, "Phenomenon Rotor Fault – Multiple Electrical Rotor Asymmetries in Induction Machines", SDEMPED 2009

[119] Christian Kral, Ruud Sprangers, Jeroen Waarma, Anton Haumer, Oliver Winter, Elena Lomonova, "Modeling Demagnetization Effects in Permanent Magnet Synchronous Machines", XIX International Conference on Electrical Machines, ICEM 2010

[120] A. Haumer, T. Bäuml, C. Kral, „Multiphysical Simulation Improves Engineering of Electric Drives", EUROSIM Conference, 2010

[121] Einhorn, M.; Conte, V.; Kral, C.; Niklas, C.; Popp, H. & Fleig, J, "A Modelica Library for Simulation of Electric Energy Storages", Modelica Conference 2011

[122] C. Jungreuthmayer, T. Bäuml, O. Winter, M. Ganchev, H. Kapeller, A. Haumer, C. Kral, "Heat and Fluid Flow Analysis of an Internal Permanent Magnet Synchronous Machine by Means of Computational Fluid Dynamics", IEEE International Electric Machines and Drives Conference, IEMDC 2011

[123] C. Kral, A. Haumer, "The New FundamentalWave Library for Modeling Rotating Electrical Three Phase Machines", Modelica Conference 2011

[124] A. Haumer, C. Kral, "Modeling a Mains connected PWM Converter with Voltage-Oriented Control", Modelica Conference 2011

[125] M. Einhorn, V. Conte, C. Kral, J. Fleig, "Comparison of Electrical Battery Models using an Optimized Parameterization Method", IEEE Vehicle Power and Propulsion Conference, VPPC, 2011

[126] Jongman Hong, Sang Bin Lee, C. Kral, and A. Haumer, "Detection and Classification of Rotor Demagnetization and Eccentricity Faults for PM Synchronous Motors", IEEE Energy Conversion Congress and Exposition, 2011

[127] Jongman Hong, Sang Bin Lee, C. Kral, and A. Haumer, "Detection of Airgap Eccentricity for Permanent Magnet Synchronous Motors based on the d-axis inductance", IEEE Symposium on Diagnostics for Electric Machines, Power Electronics and Drives, SDEMPED 2011

[128] Jose Antonino-Daviu, Jongbin Park, Sang Bin Lee, Jiyoon Yoo and C. Kral, "Detection of Broken Outer Cage Bars for Double Cage Induction Motors under the Startup Transient", IEEE Symposium on Diagnostics for Electric Machines, Power Electronics and Drives, SDEMPED 2011

[129] M. Einhorn, F. V. Conte, C. Kral, H. Popp, J. Fleig, "Parameterization of an Electrical Battery Model using a Numeric Optimization Method", Advanced Automotive Battery Conference, AABC, 2011

[130] M. Ganchev, C. Kral, H. Oberguggenberger, T. Wolbank, "Sensorless Rotor Temperature Estimation of Permanent Magnet Synchronous Motor", 37th Annual Conference of the IEEE Industrial Electronics Society, IECON, 2011

[131] H. Popp, V. Conte, C. Kral, B. Nesovic-Lukic, M. Einhorn, "New State of Health Definition Considering Capacity Fade and Impedance Increase", Advanced Automotive Battery Conference, AABC, 2011

[132] T. Bäuml, C. Jungreuthmayer, C. Kral, "An Innovative Parametrization Method for a Thermal Equivalent Circuit Model of an Interior Permanent Magnet Synchronous Machine", 37th Annual Conference of the IEEE Industrial Electronics Society, IECON, 2011

[133] A. Haumer and C. Kral, “A Parameterization Scheme for High Performance Thermal Models of Electric Machines using Modelica”, Mathmod Conference, 2012

[134] J. Gragger, C.-J. Fenz, H. Kernstock and C. Kral, “A fast inverter model for electro-thermal simulation”, Applied Power Electronics Conference and Exposition (APEC), pp. 2548-2555, 2012

[135] S. B. Lee, H. Jongman, C. Kral, "Monitoring of Airgap Eccentricity for Inverter-Fed Induction Motors based on the Differential Inductance", IEEE Energy Conversion Congress and Exposition, ECCE, Raleigh, NC, USA, 2012

[136] C. Kral, A. Haumer, S. B. Lee, "Innovative Thermal Model for the Estimation of Permanent Magnet and Stator Winding Temperatures", IEEE Energy Conversion Congress & Exposition, ECCE 2012, Raleigh, NC, USA

[137] S. B. Lee, H. Jongman, C. Kral, "Monitoring of Airgap Eccentricity for Inverter-Fed Induction Motors based on the Differential Inductance"; IEEE Energy Conversion Congress and Exposition, ECCE 2012, Raleigh, NC, USA

[138] C. Kral, A. Haumer, S. B. Lee, "Robust Thermal Model for the Estimation of Rotor Cage and Stator Winding Temperatures of Induction Machines", International Conference on Electric Machines, ICEM, Marseille, France, 2012

[139] C. Kral, A. Haumer, M. Bogomolov, V. Lomonova, "Harmonic Wave Model of a Permanent Magnet Synchronous Machine for Modeling Partial Demagnetization under Short Circuit Conditions", International Conference on Electric Machines, ICEM, Marseille, France, 2012

[140] O. Winter, C. Kral, E. Schmidt, "Design study of magnet shapes for axial Halbach arrays using 3D Finite Element Analyses", International Conference on Electric Machines, ICEM, Marseille, France, 2012

[141] M. Ganchev, C. Kral, T. Wolbank, "Compensation of Speed Dependency in Sensorless Rotor Temperature Estimation for Permanent Magnet Synchronous Motor", International Conference on Electric Machines, ICEM, Marseille, France, 2012

[142] O. Winter, C. Kral, E. Schmidt, "Augmented temperature degrading effect of rare earth magnets arranged in segmented Halbach arrays", INTERMAG 2012, Vancouver, Canada

[143] O. Winter, S. Ucsnik, C. Kral, E. Schmidt, "Ironless In-Wheel Hub Motor Design by Using Multi-Domain Finite Element Analyses", IEEE International Symposium on Power Electronics, Electrical Drives, Automation and Motion SPEEDAM 2012

[144] M. Bogomolov, C. Kral, A. Haumer, E. Lomonova, "Modeling of Permanent Magnet Synchronous Machine with Fractional Slot Winding", Conference of the IEEE Industrial Electronics Society, IECON, 2012

[145] M. Ganchev, C. Kral, T. Wolbank, "Sensorless Rotor Temperature Estmation Technique for Permanent Magnet Synchronous Motor under Load Condition", Conference of the IEEE Industrial Electronics Society, IECON, 2012

[146] M. Ganchev, C. Kral, T. Wolbank, "Hardware and Software Implementation of Rotor Temperature Estimation Technique for Permanent Magnet Synchronous Motor", IEEE International Conference on ELectrical Systems for Aircraft, Railway and Ship Propulsion, ESARS, 2012

[147] M. Ganchev, C. Kral, T. Wolbank, "Simplified Sensorless Rotor Temperature Estimation of Interior Permanent Magnet Synchronous Motor", Symposium on Power Electronics Electrical Drives Advanced Machines Power Quality, SPEEDAM, 2012

[148] M. Ganchev, C. Kral, T. Wolbank, "Optimization of Sensorless Rotor Temperature Estimation Technique for Permanent Magnet Synchronous Motor", International Power Electronics and Motion Control Conference, EPE-PEMC, 2012

[149] O. Winter, C. Kral, E. Schmidt, "Frequency Dependent Losses In Rectangular Shaped Litz Wire Windings For Air Cored Axial Flux Permanent Magnet Machines", 15th International Conference on Electrical Machines and Systems, ICEMS, 2012

[150] Winter, O.; Kral, C. & Schmidt, E. (2013), 'Design and loss assessment of air

cored axial flux permanent magnet machines', *2013 IEEE International Electric Machines Drives Conference (IEMDC)*, 602-606.

[151] Woehrnschimmel, R.; Kral, C.; Muellner, F.; Wild, S.; Neudorfer, H. & Dangl, F. (2013), 'A combined hysteresis and eddy-current model developed for a wide frequency range in electric machine applications', *Energy Conversion Congress and Exposition (ECCE), 2013 IEEE*, 3180-3185.

[152] Haumer, A. & Kral, C. (2014), 'The New EDrives Library: A Modular Tool for Engineering of Electric Drives', *10th International Modelica Conference*.

[153] Kral, C. & Haumer, A. (2014), 'New Multi Phase Quasi Static FundamentalWave Electric Machine Models for High Performance Simulations', *10th International Modelica Conference*.

[154] Kral, C.; Haumer, A. & Wöhrnschimmel, R. (2014), 'Extension of the FundamentalWave Library towards Multi Phase Electric Machine Models', *10th International Modelica Conference*.

[155] Philip Eberhart, Tek Shan Chung, Anton Haumer, Christian Kral, "Open Source Library for the Simulation of Wind Power Plants", Proceedings of the 11th International Modelica Conference, Versailles, France, September 21-23, 2015

[156] Anton Haumer, Christian Kral, "Enhancements of Electric Machine Models: The EMachines Library", Proceedings of the 11th International Modelica Conference, Versailles, France, September 21-23

Buchbeiträge

[157] D. Schröder (Mitautoren A. Haumer, C. Kral) „Modellierung elektrischer Maschinen“ in Elektrische Antriebe - Regelung von Antriebssystemen, Springer Verlag, 3. Auflage, Januar 2009, pp. 1087-1105, ISBN-13: 978-354089612

[158] Christian Grabner, Johannes Gragger, Hansjörg Kapeller, Anton Haumer, Christian Kral, “Sensorless PM-Drive Aspects”, Lecture Notes in Electrical Engineering, Electronic Engineering and Computing, Vol. 60, Technology, Springer Netherlands, pp. 25-35 (DOI 10.1007/978-90-481-8776-8_3), 2010

[159] Christian Kral, Anton Haumer, Christian Grabner , “Broken Rotor Bars in Squirrel Cage Induction Machines – Modeling and Simulation”, Lecture Notes in Electrical Engineering, Electronic Engineering and Computing, Vol. 60, Technology, Springer Netherlands, pp. 81-91 (DOI 10.1007/978-90-481-8776-8_7), 2010

[160] Christian Kral, Anton Haumer, Christian Grabner, “Determination of Consistent Induction Motor Parameters”, Lecture Notes in Electrical Engineering, Electronic Engineering and Computing, Vol. 60, Technology, Springer Netherlands, pp. 71-80 (DOI 10.1007/978-90-481-8776-8_7), 2010

[161] Hansjörg Kapeller, Anton Haumer, Christian Kral, Christian Grabner, „ Different Designs of Large Chipper Drives“, Lecture Notes in Electrical Engineering, Electronic Engineering and Computing, Vol. 60, Technology, Springer Netherlands, pp. 93-104 (DOI 10.1007/978-90-481-8776-8_9), 2010

[162] Christian Kral, Thomas G. Habetler, “Condition Monitoring and Fault Detection of Electric Drives”, Fault Detection, Intech Web, ISBN 978-953-307-037-7, pp. 153-176, 2010

[163] C. Kral, A. Haumer, “Object Oriented Modeling of Rotating Electrical Machines”, book chapter in “Advances in Computer Science and Engineering”, Intech publishing house, ISBN 978-953-7619-X-X, pp. 135-160, 2011

Seminare und Vorträge ohne Publikationsband

[164] C. Kral, »ACSL Simulation von fehlerhaften elektrischen Maschinen« Seminar S50, ARGESIM TU Wien, Wien, November 1998

[165] C. Kral, F. Pirker, G. Pascoli, »Detektion von Motorasymmetrien mittels Modellrechnungen«, VDE Workshop Monitoring und Diagnose elektrischer Maschinen und Antriebe, Frankfurt, Juni 2001

[166] C. Kral, »Monitoring von elektrischen und mechanischen Zustandsgrößen zur Detektion von Fehlern in elektrischen Maschinen«, Seminar, Eidgenössische Technische Hochschule (ETH), Zürich, Schweiz, Juli 2003

[167] C. Kral, »Monitoring von elektrischen und mechanischen Zustandsgrößen zur Detektion von Fehlern in elektrischen Maschinen«, OVE Seminar, Wien, November 2003

[168] C. Kral, »Seminar Elektrische Maschinen«, internes Seminar, Arsenal Research, Wien, Januar und Februar 2005

[169] C. Kral, »Simulation von Antrieben für automotive Anwendungen«, Beitrag zur Tagung Trends und industrielle Lösungen in Antriebssystemen, OVE, Wien, April 2005

[170] C. Kral, Internes Seminar »How to write a scientific paper with Scientific Word and Matlab«, Wien, Mai 2006

[171] C. Kral, VDE Seminar »Monitoring und Diagnose von Asynchronmaschinen«, Frankfurt, November 2006

[172] C. Kral, Präsentation »Effiziente Schienenfahrzeuge durch Optimierung des Designprozesses von Fahrmotoren«, 2. Internationale Tagung Kostenoptimierung im Schienenverkehr, Wien, November/Dezember 2006

[173] C. Kral, Präsentation »Monitoring und Diagnose von Asynchronmaschinen«, OVE Symposium Innovative Elektrische Antriebe – erfolgreich durch Intelligenz und Effizienz, Wien, April 2008

[174] C. Kral, VDE Seminar "Monitoring und Diagnose von Asynchronmaschinen", München, Deutschland, März 2009

[175] C. Kral, AIT internes Seminar "Verfassen wissenschaftlicher Texte mit LyX und Matlab", Wien, Mai 2009

[176] C. Kral, AIT internes Seminar „Development of Modelica Libraries with Subversion and Trac", September 2009

[177] C. Kral, AIT internes Seminar „Development of Modelica Libraries with Subversion and Trac", June 2010

[178] D. Bauer & C. Kral, Internes Seminar, „Publishing Papers", August 2010

[179] C. Kral, First Public Workshop on Vehicle Concept Modeling (Vienna), "Electric Drive Modeling and Design", October 2010

[180] C. Kral, "Applying Subversion and Trac to Library Development, Proposals and Publications", AIT internal Seminar, February 2012

[181] C. Kral, »Quick and Efficient Development of Complex Mechatronic Systems using Virtual Prototypes and Multi Domain Physical Simulation«, FH Wr. Neustadt, 2014, 2015, 2016, 2017

[182] A. Haumer, C. Kral, "Simulatiosseminar Modelica", Seminar Nr. 351F5SWJ03 der Pädagogischen Hochschule NÖ, März 2015

[183] C. Kral, SCHÜLF "Modelica : Objektorientierte Modellierungssprache für physikalische Systeme", LV-Nr. 3218FKS816 der Pädagogischen Hochschule Wien, Februar 2018

Erteilte Patente

[184] C. Kral, "Verfahren zur Erkennung von Exzentrizitäten des Läufers bei Asynchronmaschinen durch Modellrechnungen", Patent AT 408 812 B (AT 412 586), veröffentlicht am 25. März 2002

[185] C. Kral, »Verfahren zur Erkennung von Unwuchten und Exzentrizitäten des Rotors von Asynchronmaschinen ohne Drehzahlmessung«, Patent AT 412 586, veröffentlicht am 25. April 2005

[186] C. Kral, »Vorrichtung zum Schätzen des Verdrehwinkels zwischen Rotor und Stator einer Asynchronmaschine«, Patent AT 412 518, veröffentlicht am 25. August 2005

[187] C. Kral, J.V. Gragger, »Verfahren und Einrichtung zur Ermittlung des Verdrehwinkels zwischen dem Rotor und dem Stator einer Asynchronmaschine«, Patent AT 504 628, veröffentlicht am 15. Juni 2009

[188] C. Kral, »Verfahren zur Bestimmung und Nachführung der Rotorreaktanz und der Rotorzeitkonstante bei Asynchronmaschinen durch Modellrechnungen«, AT 505-586, veröffentlicht am 15. Februar 2010

Lehrveranstaltungen

Eigenverantwortlich gehaltene Lehrveranstaltungen

Die folgenden Vorlesungen habe ich während meiner Tätigkeit als Visiting Professor am Georgia Institute of Technology, Georgia, USA, im Zeitraum 2002–2003 eigenverantwortlich druchgeführt:

- C. Kral, course ECE 4330, »Power Electronics«, Spring 2002 and 2003
- C. Kral, course ECE-3301, »Energy Conversion and Mechatronics«, Summer 2002
- C. Kral, course ECE-3070, »Electromechanical Systems and Energy Conversion«, Winter 2002

Lehrveranstaltung an der FH Technikum-Wien

- C. Kral, A. Haumer, »Anlagentechik und Simulaton (Modelica/Dymola)«, Sommersemester 2014–2015
- C. Kral, »Anlagentechik und Simulaton (Modelica/Dymola)«, Sommersemester 2016–laufend

Mitwirkung bei Lehrveranstaltungen

An den nachfolgend angeführten Lehrveranstaltungen habe ich im Zeitraum 1997–2000 als Assistent am Institut für Elektrische Antriebe und Maschinen der TU Wien mitgewirkt:

- LVA 372.537, »Betrieb elektrischer Maschinen«, Vorlesung
- LVA 372.581, »Stromrichtergespeiste Antriebe«, Laborübung
- LVA 372.614, »Elektrische Maschinen und Antriebe«, Vorlesung
- LVA 372.625, »Elektrische Maschinen und Antriebe, Teil: Synchronmaschine«, Übung
- LVA 372.636, »Elektrische Maschinen und Antriebe, Teil: Synchronmaschine«, Laborübung
- LVA 372.647, »Antriebe«, Vorlesungen
- LVA 372.658, »Antriebe, Teil: Synchronmaschine«, Übung
- LVA 372.669, »Labor Maschinen und Anlagen, Teil: Synchronmaschine«, Laborübung
- LVA 372.680, »Elektrotechnik und Elektronik für MB und VT, Teil: Drehstromsysteme und Asynchronmotoren«, Laborübung

Betreute und mitbetreute Diplomarbeiten / Masterthesen

[1] K. Kafka, »Untersuchungen von Fehlerzuständen am Umrichter einer feldorientiert geregelten Asynchronmaschine«, ausgeführt am Institut für elektrische Antriebe und Maschinen, TU Wien, März 1999.

[2] H. Oberguggenberger, »Untersuchung der Vienna Monitoring Method hinsichtlich Genauigkeitsschranke für eine zuverlässige Detektion von defekten Rotorstäben im Käfigläufer einer Asynchronmaschine«, ausgeführt am Institut für elektrische Antriebe und Maschinen, TU Wien, Mai 2000.

[3] M.D. Ganchev, »Design and Implementation of an Operating System for the TMS320C6713 DSP Used in Motor Test Unit for Monitoring and Controlling Both Permanent Magnet Synchronous and Induction Motors«, ausgeführt am Institut für elektrische Antriebe und Maschinen, TU Wien, Juni 2005.

[4] J. Gragger, “ Verbesserung des Entwicklungsprozesses von elektromechanischen Systemen mittels multiphysikalischer Simulation dargestellt am Beispiel einer batteriebetriebenen Klimaanlage“, Technikum Wien, Studiengang Internationales Wirtschaftsingenieurwesen, MIWI, Dezember 2008

[5] E. Calis, “Modelica-Simulation einer feldorientiert geregelten Asynchronmaschine mit integrierter Nachführung der Maschinenparameter”, ausgeführt am Institut für elektrische Antriebe und Maschinen, TU Wien, Juni 2009

[6] A. Huzsvar, „Validation of simple thermal model of permanent magnet synchronous induction machine“, Diplomarbeit, Technikum Wien, Betreuung

gemeinsam mit A. Haumer, 2013

[7] M. Eichinger, »Virtual Power Plant for the Hotel Industry: Energy Management of AC Systems and its Impact on Power Grids«, Masterthese, Technikum Wien, Januar 2016

[8] Philipp Pfeiler, »Regelungsmöglichkeiten für Fernwärme-Kessel mit Warmwasser- Speicher unter Berücksichtigung von Speicher-, Abnehmer- und Außentemperatur- Messwerten«, Masterthese, Technikum Wien, September 2017

[9] Martin Holl, »Modellierung und Simulation einer Rotationswärmepumpe auf Basis der Modelica Standard Library«, Masterthese, Technikum Wien, September 2017

[10] Penyo Traykov, »Energieeffizienzsteigerung und Simulation der Energie- und Massenströme der zentralen Versorgung mit Honöl in der Produktion von Kegelrollenlagern der Firma Schaeffler Austria«, Masterthese, Technikum Wien, September 2018

Preise und Auszeichnungen

- November 1998: Verleihung des ÖGE (Österr. Gesellschaft für Energietechnik) – Förderpreises
- November 2000: Verleihung des ÖGE (Österr. Gesellschaft für Energietechnik) – Förderpreises
- Dezember 2000: Verleihung des ARCS – Award in der Kategorie Wissenschaft 1. Preis
- Dezember 2001: Verleihung des ARCS – Award in der Kategorie Wissenschaft 3. Preis
- September 2011, SDEMPED prize paper award for the outstanding technical competence displayed in the paper entitled “Detection of Broken Outer Cage Bars for Double Cage Induction Motors under the Startup Transient”; award recipients are J. Antonino-Daviu, M. Riera-Guasp, J. Pons-Llinares, J. Park, S. Lee, J. Yoo and C. Kral
- September 2011, VPPC best paper prize awarded to M. Einhorn, V. Conte, C. Kral and J. Fleig for the paper presented at VPPC 2011 entitled “Comparison of Electric Battery Models using a Numerically Optimized Parameterization Method”
- Mai 2012, First Prize Paper Award for Electric Machines Committee for the publication of Jongman Hong, Sang Bin Lee, Christian Kral, and Anton Haumer, “Detection of Airgap Eccentricity for Permanent Magnet Synchronous Motors based on the d-axis Inductance”, published at ECCE 2011
- 2016, Qualify.ing Contest: 3. Preis des Maturaprojekts "Entwicklung eines elektrischen Antriebsstrangs für ein Elektromoped – EMO" für Michael Hochstöger, David Lachnit, Julia Roth und Thomas Mayer (Betreuer Christian Kral), Technologenverband, http://www.technologe.at, TGM, Wien
- 2016, Bosch Award: Diplomarbeit "Entwicklung eines elektrischen Antriebsstrangs für ein Elektromoped – EMO" von Michael Hochstöger, David Lachnit, Thomas Mayer,Julian Roth (Betreuer Christian Kral) wurde in der Kathegorie Mobilitätstechnik als eine der besten fünf Einreichungen des Jahres 2016 nominiert

Mitgliedschaften

- Österreichischer Verband für Elektrotechnik, ÖVE, Mitgliedsnummer 12030
- bis 2013: The Institute of Electrical and Electronics Engineers, IEEE, Mitglied seit 2000, Senior Member seit 2005
- Modelica Association (www.modelica.org), Mitglied seit 2004, Library Officer für die Modelica Standard Library

Internationale Organisationsarbeit

- Modelica Design Group (www.modelica.org): Mitbetreuung der Modelica Standard Library
- Technical Program Chair of the 2005 IEEE Symposium on Diagnostics for Electrical Machines, Power Electronics & Drives, hosted by Arsenal Research, conference venue Parkhotel Schönbrunn, September 7–9, 2005
- General Conferfence Chair of the 2006 Modelica Conference, hosted by Arsenal Research, conference venue Tech Base Vienna, Vienna, September 4–6, 2006
- Industrial Forum Co-Chair of the IEEE Symposium on Diagnostics for Electrical Machines, Power Electronics & Drives, SDEMPED 2009
- Electric Machines and Drives Track Chair at the 39th Annual Conference of the IEEE Industrial Electronics Society, IECON 2013
- bis 2013: Steering Committee of IEEE Symposium on Diagnostics for Electrical Machines, Power Electronics & Drives, SDEMPED
- Associate Editor für die »IEEE Transactions on Industry Applications«, 2012-2013