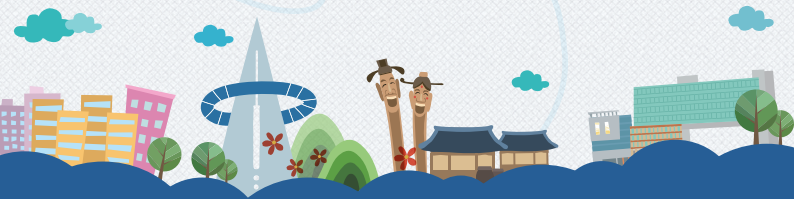


21st International Conference on
the Computation of Electromagnetic Fields

Compumag 2017

June 18-22, 2017

Daejeon Convention Center (DCC), Daejeon, Korea



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Welcome Message



We are very pleased to invite you to participate in Compumag 2017 to be held in Daejeon from June 18 ~ 22, 2017.

Compumag 2017 is one of the most important events that bring our members together from around the world to share professional experiences, expand our professional networks, and receive updates on the latest advances in science and technology in the field of computational electromagnetics.

The scientific programs will provide all participants with opportunities to exchange the latest information, ideas, and experiences on computational electromagnetics. The Plenary Session features Prof. David Lowther, McGill University, Canada; Prof. Hajime Igarashi from Hokkaido University. Also, Compumag 2017 has received over 730 digests from all over the world and over 400 digests will be presented.

The hosting city of Compumag 2017, Daejeon has grown into a world-class science and cultural city as a result of both cultural heritage and metropolitan developments. I firmly believe Compumag 2017 in Daejeon would be an exciting and memorable experience to all.

I am truly welcoming you all to Daejeon and I assure you that this conference will be an academically enriching, socially enjoyable, and truly memorable experience for all delegates and accompanying persons.

Thank you very much.

Sincerely,

Jung, Hyun-Kyo
General Chair, Compumag 2017

Conference Organizers



General

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Plenary Speakers



David Lowther

McGill University, Canada

Title: The Design of Electromagnetic Devices:
From Simulation to Reality

Abstract

Design is an iterative process which involves determining whether the performance of the proposed solution meets the specifications provided. To achieve this, either the physical device must be constructed or a simulation model built. Since the start of the age of electrical machinery in 1821, both approaches have been used in the design of electrical machines, i.e. physical devices have been constructed, measured and modified to meet the requirements; and simulation models generated in an attempt both to predict the performance of a proposed design and to indicate how to modify the design to move towards the specifications. Simulation models themselves have advanced along two, parallel paths. The first involves either the development of lumped parameter circuit structures or some form of polynomial fit to the performance space. Both of these attempt to capture the global performance of the device as a function of the design parameters. The second involves starting from the basic physics, described by Ampere and Faraday and later embedded in Maxwell's equations, to determine the structure of the electromagnetic field in the device. From the field, the global performance of the device can be determined and compared to the requirements. In addition, local information can allow a user to determine the loss and local force distributions, etc., which, in turn, allow coupling to other areas of physics such as thermal, vibration and acoustics. However, while the simulation of the physics system can now be performed with considerable accuracy, the performance predicted often deviates from that measured on the constructed, physical device. This is due to the uncertainties involved in the input data to the system such as the material properties, the physical dimensions, the operating conditions, etc. The intention of the presentation will be to address this problem and describe the issues involved in creating a design process which more accurately predicts the performance of the manufactured device.

**Hajime Igarashi***Hokkaido University, Japan***Title:** Model Order Reduction, Homogenization
and Their Combination**Abstract**


Conventional FE analysis is too time consuming to perform dynamic simulations of electric apparatus such as motors and inductors coupled with power circuits. Although behavior model or equivalent circuits works very fast, they cannot evaluate eddy current losses accurately, and their computational accuracy is sometimes unsatisfactory. In this talk, it is shown that the model order reduction (MOR) can be the alternative to these methods. The MOR approach converts the original FE equation to reduced one with small number of unknowns. The reduced FE equation can be solved much faster than the original equation. Moreover, it is possible to synthesize the equivalent circuit of electric apparatus directly from the reduced FE equation.

Conventional FEM also needs unacceptably long computational time to analyze materials composed of multiple elements such as a multi-turn coil, Litz-wire coil and soft magnetic core (SMC). The homogenization method is shown to be fairly effective for the eddy current analysis of these materials considering the skin and proximity effects. In this method, the material composed of small unit cells is modeled as homogeneous materials with macroscopic complex permeability. This method allows us, therefore, to perform the FE analysis with rather coarse FE meshes, and to reduce the computational time.

In the homogenization method, the complex permeability is represented as a function of frequency. For a simple structure, it can be written in a closed-form. When it is hard to obtain the closed-form expression, MOR is very useful; the macroscopic property is obtained by solving the field in a unit cell, and then its frequency property is represented as a rational polynomial using MOR techniques such as Padé and Lanczos and proper orthogonal decomposition.

In addition to the theory and mathematical formulation of these methods, their application to analysis of inductors, wireless energy transfer device and IPM motors will be reported.

Program at a Glance



☉ June 19, 2017 (Monday)

08:00-17:00	Registration				Exhibition (1F, Lobby of Poster Sessions rooms)
08:30-09:00	Opening (2F, Grand Ballroom)				
09:00-10:00	Plenary 1 + 2 (2F, Grand Ballroom)				
10:00-10:40	OA1: Optimisztion and Design 1 (2F, Grand Ballroom)				
10:40-11:00	Coffee Break				
11:00-12:50	Poster Sessions				
	Rm. 101	Rm. 102	Rm. 103	Rm. 104	
	PA-M1: Static and Quasi-Static Fields 1	PA-M2: Optimization and Design 1	PA-M3: Multi-physics and Coupled Problems 1 / Electromagnetic Sensors		
12:50-14:10	Lunch (2F, Rm 202)				
14:10-16:00	Poster Sessions				
	Rm. 101	Rm. 102	Rm. 103	Rm. 104	
	PA-A4: Optimization and Design 2	PA-A5: Numerical Techniques 1	PA-A6: Electromagnetic Compatibility	PA-A7: Bio-Electromagnetic Computation	
16:00-16:20	Coffee Break				
16:20-18:00	OA2: Material Modelling (2F, Rm 201)				

© June 20, 2017 (Tuesday)

08:00-17:00	Registration				Exhibition (1F, Lobby of Poster Sessions rooms)
09:00-10:40	OB1: Mathematical Modelling & Formulations (2F, Rm 201)				
10:40-11:00	Coffee Break				
11:00-12:50	Poster Sessions				
	Rm. 101	Rm. 102	Rm. 103	Rm. 104	
	PB-M1: Optimization and Design 3	PB-M2: Optimization and Design 4	PB-M3: Material Modelling 1	PB-M4: Novel Computational Methods for Machines and Devices 1	
12:50-14:10	Lunch (2F, Rm 202)				
14:10-16:00	Poster Sessions				
	Rm. 101	Rm. 102	Rm. 103	Rm. 104	
	PB-A5: Optimization and Design 5	PB-A6: Static and Quasi-Static Fields 2	PB-A7: Numerical Techniques 2	PB-A8: Wave Propagation 1	
16:00-16:20	Coffee Break				
16:20-18:00	OB2: Numerical Techniques (2F, Rm 201)				
19:30-20:30	Korean Culture Evening (3F, Conference Hall)				

© June 21, 2017 (Wednesday)

9:00-10:40	OC1: Static & Quasi-Static Fields / Wave propagation (2F, Rm 201)				Exhibition (1F, Lobby of Poster Sessions rooms)
10:40-11:00	Coffee Break				
11:00-12:50	Poster Sessions				
	Rm. 101	Rm. 102	Rm. 103	Rm. 104	
	PC-M1: Optimization and Design 6	PC-M2: Static and Quasi-Static Fields 3	PC-M3: Mathematical Modelling and Formulations 1 / Multi-scale Modelling and Homogenization		
12:50-14:10	Lunch (2F, Rm 202)				
14:10-16:00	Poster Sessions				
	Rm. 101	Rm. 102	Rm. 103	Rm. 104	
	PC-A4: Optimization and Design 7	PC-A5: Optimization and Design 8	PC-A6: Numerical Techniques 3	PC-A7: Material Modelling 2	
16:00-16:20	Coffee Break				
16:20-18:00	OC2: Optimization and Design 2 (2F, Rm 201)				
19:00-21:00	Conference Dinner (Hotel ICC, 1F, Crystal Ballroom)				

© June 22, 2017 (Thursday)

9:00-10:40	OD1: Novel Computational Methods for machines & Devices (2F, Rm 201)				Exhibition (1F, Lobby of Poster Sessions rooms)
10:40-11:00	Coffee Break				
11:00-12:50	Poster Sessions				
	Rm. 101	Rm. 102	Rm. 103	Rm. 104	
	PD-M1: Wave Propagation 2	PD-M2: Novel Computational Methods for Machines and Devices 2	PD-M3: Optimization and Design 9	PD-M4: Multi-physics and Coupled Problems 2	
12:50-14:10	Lunch (2F, Rm 202)				
14:10-16:00	Poster Sessions				
	Rm. 101	Rm. 102	Rm. 103	Rm. 104	
	PD-A5: Optimization and Design 10	PD-A6: Static and Quasi-Static Fields 4	PD-A7: Mathematical Modelling and Formulations 2 / Software Methodology		
16:00-16:20	Coffee Break				
16:20-18:00	OD2: Multi-physics and Coupled Problems (2F, Rm 201)				
18:00-18:30	Closing (2F, Rm 201)				

Technical Program - Oral Sessions



Monday, June 19

	Monday, June 19
10:00-10:40	OA1: Optimization and Design 1 Session Chair: Jan Sykulski (Univ. of Southampton, UK)
16:20-18:00	OA2: Material Modelling Session Chair: Tetsuji Matsuo (Kyoto Univ., Japan)

Tuesday, June 20

	Tuesday, June 20
09:00-10:40	OB1: Mathematical Modelling & Formulations Session Chair: David Lowther (McGill Univ., Canada)
16:20-18:00	OB2: Numerical Techniques Session Chair: Oszkar Blro (TU Graz, Austria)

Wednesday, June 21

	Wednesday, June 21
09:00-10:40	OC1: Static & Quasi-Static Fields / Wave propagation Session Chair: Osama Mohammed (Florida Int'l Univ., USA)
16:20-18:00	OC2: Optimization and Design 2 Session Chair: Kay Hameyer (RWTH Aachen Univ., Germany)

Thursday, June 22

	Thursday, June 22
09:00-10:40	OD1: Novel Computational Methods for Machines & Devices Session Chair: Hajime Igarashi (Hokkaido Univ., Japan)
16:20-18:00	OD2: Multi-physics and Coupled Problems Session Chair: Herbert De Gerssem (TU Darmstadt, Germany)

Technical Program - Poster Sessions

Monday, June 19

11:00-12:50	PA-M1: Static and Quasi-Static Fields 1	#101
	Session Chair: Ziyan Ren (Shenyang Univ. of Tech., China)	
	
11:00-12:50	PA-M2: Optimization and Design 1	#102
	Session Chair: Zhuoxiang Ren (Université Pierre et Marie CURIE, France)	
	
11:00-12:50	PA-M3: Multi-physics and Coupled Problems 1 / Electromagnetic Sensors	#103-#104
	Session Chair: Patrick Kuo-Peng (Federal Univ. of Santa Catarina, Brazil)	
	
14:10-16:00	PA-A4: Optimization and Design 2	#101
	Session Chair: Dianhai Zhang (Shenyang Univ. of Tech., China)	
	
14:10-16:00	PA-A5: Numerical Techniques 1	#102
	Session Chair: Stéphane Clenet (Arts et Métiers ParisTech., France)	
	
14:10-16:00	PA-A6: Electromagnetic Compatibility	#103
	Session Chair: József Pávó (Budapest Univ. of Tech. and Economics, Hungary)	
	
14:10-16:00	PA-A7: Bio-Electromagnetic Computation	#104
	Session Chair: Nathan Ida (The Univ. of Akron, USA)	

Tuesday, June 20

11:00-12:50	PB-M1: Optimization and Design 3	#101
	Session Chair: So Noguchi (Hokkaido Univ., Japan)	
	PB-M2: Optimization and Design 4	#102
	Session Chair: Katsumi Yamazaki (Chiba Inst. of Tech., Japan)	
	PB-M3: Material Modelling 1	#103
	Session Chair: Joao Pedro Assumpcao Bastos (Federal Univ. of Santa Catarina, Brazil)	
	PB-M4: Novel Computational Methods for Machines and Devices 1	#104
	Session Chair: Maurizio Repetto (the Politecnico di Torino, Italy)	
14:10-16:00	PB-A5: Optimization and Design 5	#101
	Session Chair: Junghwan Chang (Dong-a Univ., Korea)	
	PB-A6: Static and Quasi-Static Fields 2	#102
	Session Chair: Anouar Belahcen (Aalto Univ., Finland)	
	PB-A7: Numerical Techniques 2	#103
	Session Chair: Kazuhiro Muramatsu (Chiba Univ., Japan)	
	PB-A8: Wave Propagation 1	#104
	Session Chair: Sandor Bilicz (Budapest Univ. of Tech. and Economics, Hungary)	

Wednesday, June 21

11:00-12:50	PC-M1: Optimization and Design 6	#101
	Session Chair: Jang-Young Choi (Chungnam Nat'l Univ., Korea)	
	PC-M2: Static and Quasi-Static Fields 3	#102
	Session Chair: Behzad Forghani (Infolytica Corp., Italy)	
	PC-M3: Mathematical Modelling and Formulations 1 / Multi-scale Modelling and Homogenization	#103-#104
	Session Chair: Dong-hun Kim (Kyungpook Nat'l Univ., Korea)	
14:10-16:00	PC-A4: Optimization and Design 7	#101
	Session Chair: Sang-Yong Jung (Sungkyunkwan Univ., Korea)	
	PC-A5: Optimization and Design 8	#102
	Session Chair: Chang-Eob Kim (Hoseo Univ., Korea)	
	PC-A6: Numerical Techniques 3	#103
	Session Chair: Jung Ho Lee (Hanbat Nat'l Univ., Korea)	
	PC-A7: Material Modelling 2	#104
	Session Chair: Yanli Zhang (Shenyang Univ. of Tech., China)	

Thursday, June 22

11:00-12:50	PD-M1: Wave Propagation 2 #101
	Session Chair: Yasushi Kanai (Niigata Inst. of Tech., Japan)
	PD-M2: Novel Computational Methods for Machines and Devices 2 #102
	Session Chair: Bai Baodong (Shenyang Univ. of Tech., China)
14:10-16:00	PD-M3: Optimization and Design 9 #103
	Session Chair: Byungtak Kim (Kunsan Nat'l Univ., Korea)
	PD-M4: Multi-physics and Coupled Problems 2 #104
	Session Chair: Se-Hee Lee (Kyungpook Nat'l Univ., Korea)
14:10-16:00	PD-A5: Optimization and Design 10 #101
	Session Chair: Shiyong Yang (Zhejiang Univ., China)
	PD-A6: Static and Quasi-Static Fields 4 #102
	Session Chair: Gwansoo Park (Pusan Nat'l Univ., Korea)
14:10-16:00	PD-A7: Mathematical Modelling and Formulations 2 / Software Methodology #103-#104
	Session Chair: Raffaele Martone (Universita' degli Studi della Campania "L. Vanvitelli", Italy)

Presentation Guideline



● Oral presentations

- Each oral presentation will be given 20 minutes including Q&A.
- Session rooms will be ready with laptop computers installed with MS Power Point, which the speakers are encouraged to use for their presentations in order to avoid delays in schedule.
- The speakers are advised to bring their PowerPoint presentation files on USB memory sticks AND be also ready with a backup version of their presentations. Please transfer the file to the laptop computer in the session room during the break before the sessions
- If you are a Mac user, please bring your Mac-to-VGA adapter.
- Speakers are expected to arrive at the session room 15 minutes BEFORE the start of their sessions to report to the session chair.
- A proctor will also be available in case you need technical assistance

● Poster presentations

The authors of the papers accepted for poster presentations are expected asked to prepare their posters in advance, display them on the designated panels during the put-up time for the discussions through the entire duration of the session.

Please ensure to take your posters down during the take-down time. The posters remaining unattended after the session will be discarded.

Compumag 2017	Morning Session		Afternoon Session	
	Put-up	Take-down	Put-up	Take-down
June 19 (Mon)	08:30~11:00	12:50~13:10	13:30~14:10	16:00~16:30
June 20 (Tue)				
June 21 (Wed)				
June 22 (Thu)				

General Information



Wi-Fi Internet Services

Free wifi is available in each session room. There is no need to put any ID and Password. There may be limitation of access depending on the number of users in each room.

Lunch

Free lunch is available for all conference registrants at the Grand Ballroom (2F, Rm 202) for 4 days from June 19 to June 22.

Welcome Reception

All participants are welcome to take part in the Welcome Reception between 18:30 and 20:00. It will be take place at Terrace (2F). 2 free drinks will be offered to our registrants. (Please bring your coupons on the name tag.)

Korean Culture Evening

Do you want to experience traditional Korean culture and music? Please come to the culture evening on June 20 (Tuesday) at 19:30. It is 1 hour performance for free!

From 19:00, a special event will be there surprisingly. Do not Miss it!

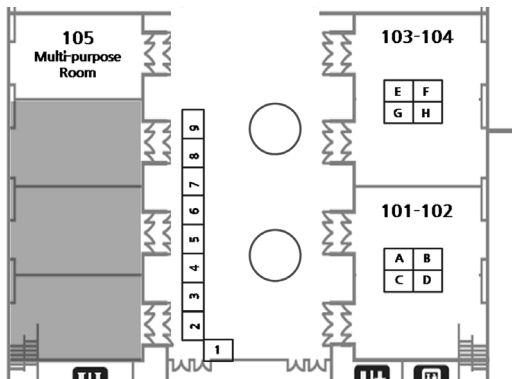
Conference Dinner

The conference dinner will be held at 19:00 at HOTEL ICC. (Crystal Ballroom, 1F) The hotel is located only 5 minutes walking distance from the conference venue. No shuttle bus will be provided by the conference organizer.

Useful Koreans

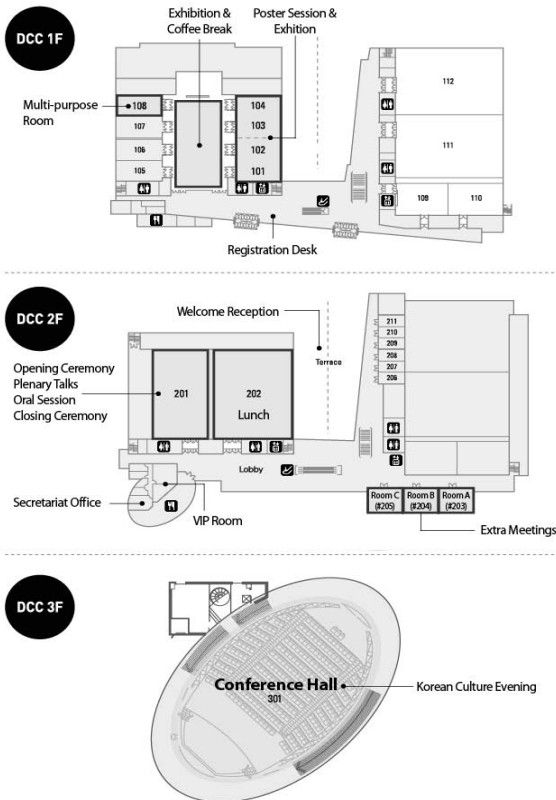
English	Korean	Korean Pronunciation
I'd like to go to DCC	DCC로 가주세요.	DCC ro-gajuseyo.
Thank you.	감사합니다.	Gamsa-hamnida.
Yes.	예.	Ye.
No.	아니요.	Aniyo.
The check, please.	계산서 주세요.	Gyesanseo juseyo

Exhibition Information



Booth No.	Name
1	EMWORKS
2	KOREA ELECTRONICS TECHNOLOGY INSTITUTE
3	Shenyang General Magnetic Co., Ltd
4	Jeonbuk Institute of Automotive convergence Technology
5	YANTAI SHOUGANG MAGNETIC MATERIALS INC
6	McSys
7	JAHWA ELECTRONICS CO., LTD.
8	REALTIMEWAVE
9	HYOSUNG
A,B	DAEBO MAGNETIC
C	ALTSOFT
D	Ciel-S
E,F	Korea Electrotechnology Research Institute
G	JAEWOO TECHNOLOGY
H	Vector Fields Korea, Inc.

Floor Plan





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COMPUMAG 2017 Secretariat

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