

LDIA 2017

Osaka

The 11th International Symposium on Linear Drives for Industry Applications

Osaka, Japan, September 6-8, 2017

**OIT UMEDA TOWER, Umeda Campus
Osaka Institute of Technology (OIT)**

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Industry Applications Society, The Institute of Electrical Engineers of Japan
(IEEJ IAS)

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The Japan Society of Applied Electromagnetics and Mechanics
The Magnetic Society of Japan
The Society of Instrument and Control Engineers

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Research Foundation for the Electrotechnology of Chubu

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Greeting from conference chair

Toshimitsu MORIZANE
LDIA 2017 Conference Chair



Ladies and gentlemen, thank you for joining us.

We are pleased to welcome you to Osaka and to the 11th International Symposium on Linear Drives for Industry Applications (LDIA 2017).

First of all, I would like to thank all the committee members and reviewers for their invaluable assistance in supporting this conference.

The goal of the symposium is to bring together researchers from both academia and industry from all over the world, and to discuss present research and development activities and future prospects related to the linear drives for industry applications.

We hope that this conference will provide a good opportunity for your research goals. We wish you to foster your network of friends and colleagues.

This year the conference is held in Osaka city, center city of the western Japan, the place to gather information, technology, culture and delicious dishes. We wish you an enjoyable stay in Japan and a productive and pleasant time at LDIA2017.

Conference Chair

Prof. Toshimitsu Morizane (Osaka Institute of Technology, Japan)

International steering committee

Chairperson

Prof. H. Ohsaki, Japan

Members

J. Driesen, Belgium

A.C. Ferreira, Brazil

J.X. Shen, China

L.M. Shi, China

Q. Lu, China

J. P. Yonnet, France

A. Binder, Germany

W.R. Canders, Germany

K. Hameyer, Germany

T. Higuchi, Japan

J. Kitano, Japan

T. Koseki, Japan

T. Mizuno, Japan

J.P. Hong, Korea

H.K. Jung, Korea

D.H. Kang, Korea

E. Lomonova, Netherlands

I. Boldea, Romania

C. Sadarangani, Sweden

A. Cassat, Switzerland

Y. Perriard, Switzerland

A. Rufer, Switzerland

F.J. Lin, Taiwan

M.C. Tsai, Taiwan

F. Eastham, UK

J. Wang, UK

Z.Q. Zhu, UK

J. Gieras, USA

S. Gurol, USA

D. Trumper, USA

Organizing Committee

Chair: Prof. Tsutomu Mizuno (Shinshu University, Japan)

Technical Program Committee

Chair: Prof. Keisuke Fujisaki (Toyota Technological Institute, Japan)

Vice chair: Prof. Shunsuke Ohashi (Department of Electrical and Electric Engineering, Kansai University, Japan)

National Steering Committee

Chair: Prof. Toshimitsu Morizane (Osaka Institute of Technology, Japan)

Vice chair: Prof. Shunsuke Ohashi (Department of Electrical and Electric Engineering, Kansai University, Japan)

Conference information.

Company-exhibition: The Company-exhibition is held at Room P.

It starts at 9:00 on 7th September and ends at 15:30 on 8th September.

- | | |
|----------------------------------|--|
| 1) Central Japan Railway Company | 2) Applied Electronics Corporation |
| 3) CYBERNET SYSTEMS CO.,LTD. | 4) Hottinger Baldwin Messtechnik GmbH (Spectris Co., Ltd.) |

Welcome Party: Welcome party starts from 18:00 at Room P, 2nd Floor, OIT UMEDA TOWER(Conference venue) on 6th September, 2017. Only the registered persons (regular, student, accompanying) and the designated persons can attend the welcome party. Please show your nametag to the staffs at the entrance of the Room P.

Coffee break: Coffee is served during the coffee break time at Room P. It is prohibited to bring any drinks and foods inside the Hall.

~~**Authors' breakfast and Lunch:** The conference authors' breakfast and the conference lunch are NOT provided. We will give you the map of the restaurants at the registration desk. Please enjoy your lunch at the restaurants. There are a lot of restaurant around conference venue. The cost depends on the restaurant and it may cost from JPY 500 to JPY 1,500. In Japan, tips are not necessary anywhere, even at hotel and restaurants~~

~~The conference venue, OIT UMEDA TOWER has the restaurant on 21st floor. You have lunch for JPY 600. You can get to the restaurant by only the elevator (lift) for the restaurant on 1st floor.~~

Please check the additional information on Front page of Web site

Banquet: Banquet starts from 18:00 on 7th September, 2017 at the 21F restaurant of the conference venue. Only the regular registration participants, the student registration participants, the registered accompanying persons and the designated persons can enter the restaurant. You can get to the restaurant by only the elevator (lift) for the restaurant at 1st floor. Please take the elevator to the restaurant. Our staffs invite you to the elevator at the 1st floor. Please contact to them.

Wifi service: Conference Free Wifi service is NOT provided. Please use eduroam, public free Wifi service or bring your own device for the Wifi.

Electricity service and Rest Area: We prepare for the several electrical outlets and tables at Room P. Sorry for inconvenient, but the number of the outlets is limited.

In Japan, plug type is A (two-pin plug) and the voltage is 100V. The frequency is 60Hz in Western Japan (including the conference venue) and 50 Hz in Eastern Japan.

Program at glance

Date: 7th Sep.(Thu)

<p>9:00-9:30</p>	<p>Opening Location: Hall Chair: Prof. T. Morizane</p>	
<p>9:30-10:10</p>	<p>Keynote Origin of Magnetism - 90 years of misunderstanding - Location: Hall Prof. Y. Kawazoe Chair: Prof. K. Fujisaki</p>	
<p>10:25-12:30</p>	<p>Oral session: Oral 1A Linear Motor 1 Location: Room 1 Chair: Prof. Y. Perriard Chair: Prof. T. Hirayama</p>	<p>Oral session: Oral 1B Linear Actuators Location: Room 2 Chair: Prof. K. Hameyer Chair: Prof. T. Mizuno</p>
<p>14:00-15:40</p>	<p>Poster Location: Room P Chair: Prof. J. Asama Chair: Prof. H. Suzuki Chair: Prof. J. Kluehspies Chair: Prof. C. B. Lee</p>	
<p>16:00-17:15</p>	<p>Oral session: Oral 2A Linear Motor 2 Location: Room 1 Chair: Prof. Y. Li Chair: Prof. N. Niguchi</p>	<p>Oral session: Oral 2B Electromagnetic and Force Fields Location: Room 2 Chair: Prof. Z. Q. Zhu Chair: Dr. T. Murai</p>
<p>18:00-20:00</p>	<p>Banquet Location: 21F Restaurant</p>	

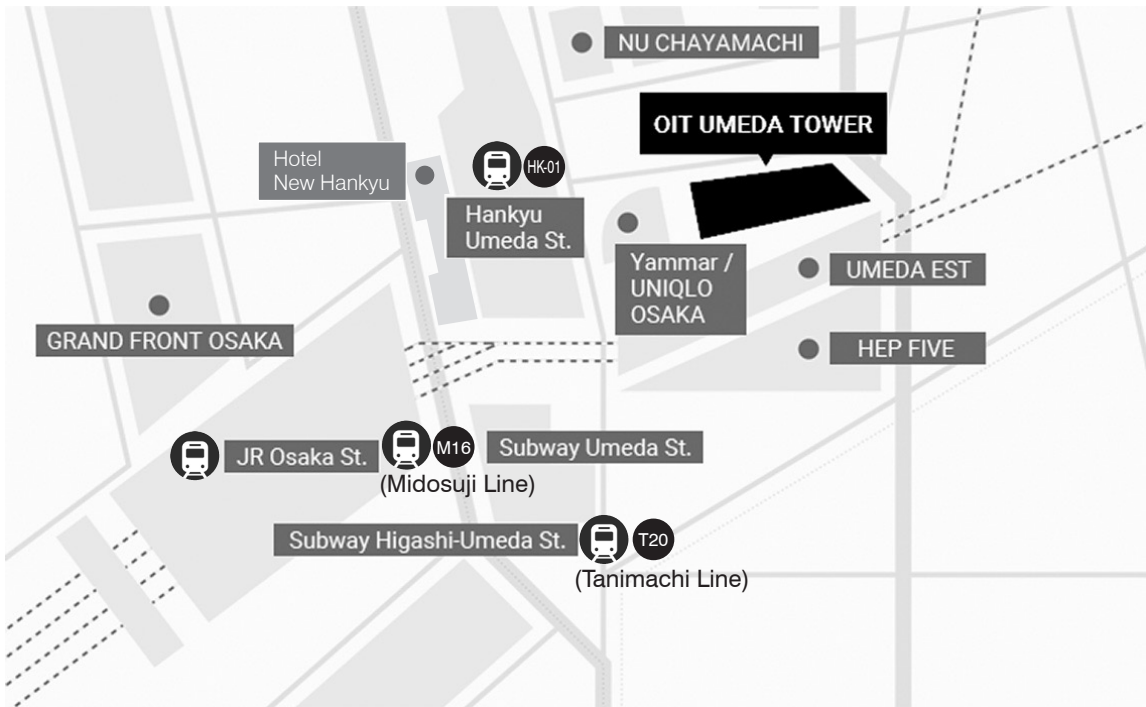
Date: 8th Sep. (Fri)

<p>9:30-10:10</p>	<p>Keynote Applications of Linear Machinery in Public Transport Location: Hall Prof. T. Koseki Chair: Prof. T. Morizane</p>	
<p>10:25-12:30</p>	<p>Oral session: Oral 3A Levitation Technologies Location: Room 1 Chair: Prof. E. A. Lomonova Chair: Prof. S. Ueno</p>	<p>Oral session: Oral 3B Transportation Location: Room 2 Chair: Prof. Q. Lu Chair: Mr. J.Kitano</p>
<p>14:00-15:15</p>	<p>Oral session: Oral 4A Trends And New Developments of Linear Drives Location: Room 1 Chair: Prof. N. Misron Chair: Prof. T. Higuchi</p>	<p>Oral session: Oral 4B Control Methods for Linear Drives Location: Room 2 Chair: Prof. L.M. Shi Chair: Prof. T. Mizuno</p>
<p>15:30-16:45</p>	<p>Oral session: Oral 5A Other Related Topics and New Technologies Location: Room 1 Chair: Prof. W. Xu Chair: Prof. T. Nakagawa</p>	<p>Oral session: Oral 5B Materials Location: Room 2 Chair: Prof. C. B. Part Chair: Dr. Y. Shindo</p>
<p>17:00-17:30</p>	<p>Closing Location: Hall Chair: Prof. S. Ohashi</p>	

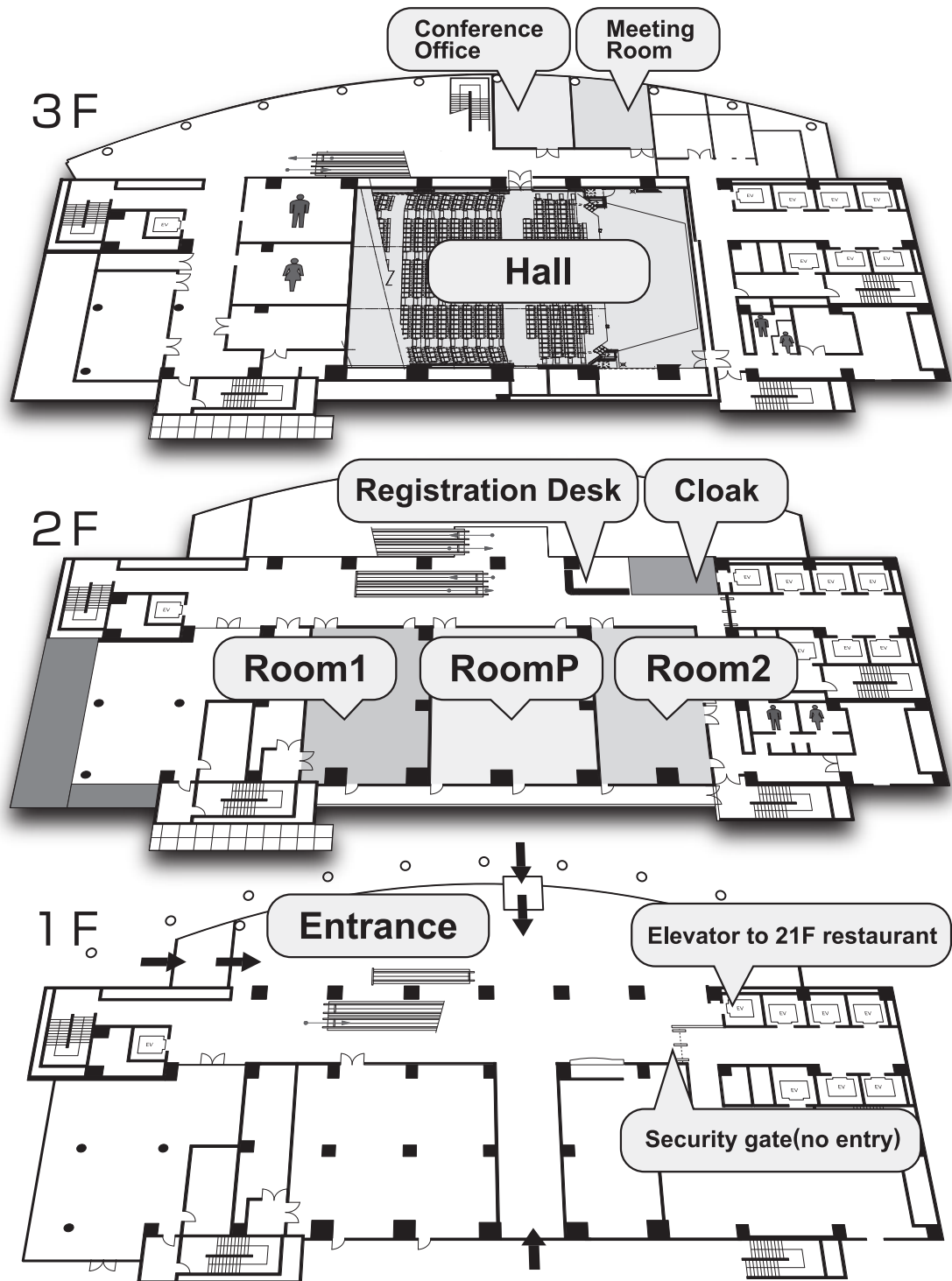
Access Map

Conference Venue: **OIT UMEDA TOWER**

Umeda Campus, Osaka Institute of Technology (OIT)
1-45 Chayamachi kita-ku, Osaka city, Osaka 530-0013, Japan



Floor Map



Keynote speech



Keynote speech 1 **Origin of Magnetism** **- 90 years of misunderstanding -**

Time: Sep. 7th: 9:30-10:10

Location: Hall, 3rd Floor

Prof. Yoshiyuki KAWAZOE
Professor in Tohoku University



Keynote speech 2 **Applications of Linear Machinery in** **Public Transport**

Time: Sep. 8th: 9:30-10:10

Location: Hall, 3rd Floor

Prof. Takafumi KOSEKI
Professor in University of Tokyo

Oral Session

Oral 1A: Linear Motor 1

Time: Sep. 7th: 10:25-12:30

Location: Room 1

Chair: Prof. Y. Perriard (EPFL)

Chair: Prof. T. Hirayama (Kagoshima Univ.)

LM-1 High-Force Linear Iron-core Fine-tooth Motor

Jun Young Yoon, Jeffrey H. Lang, David L. Trumper

Department of Mechanical Engineering, Massachusetts Institute of Technology, USA

LM-2 Considerations in the Numerical Design for the Armatures of LIM-type Eddy-Current Rail Brakes

Hiroshi Yoda, Yasuaki Sakamoto

Maglev Systems Technology Division, Railway Technical Research Institute, Japan

LM-3 Comparison of Direct and Indirectly Liquid-cooled Coreless Linear Actuators with Multi-layer Coils

T.A. van Beek, J.W. Jansen, B.L.J. Gysen, E.A. Lomonova

Electromechanics and Power Electronics, Eindhoven University of Technology, The Netherlands

LM-4 Experimental Investigation of a Partitioned Stator Flux Reversal Permanent Magnet Linear Machine

Z.Q. Zhu¹, A. L. Shurajji^{1,2}, Q. F. Lu³, Yihua Yao³

¹Department of Electronic and Electrical Engineering, University of Sheffield, UK,

²Electromagnetic Engineering Department, University of Technology, Iraq,

³Institute of Electrical Engineering, Zhejiang University, P.R. China

LM-5 Comparative Study of Two Permanent Magnet Linear Machines

Z.Q. Zhu¹, Ahlam L Shurajji^{1,2}

¹Department of Electronic and Electrical Engineering, University of Sheffield, UK,

²Electromagnetic Engineering Department, University of Technology, Iraq

Oral 1B: Linear Actuators

Time: Sep. 7th: 10:25-12:30

Location: Room 2

Chair: Prof. K. Hameyer (RWTH Aachen Univ.)

Chair: Prof. T. Mizuno (Shinshu Univ.)

LA-1 Design and Analysis of a Linear Oscillatory Actuator for Active Control Engine Mounts

Insung Choi, Katsuhiko Hirata, Noboru Niguchi

Department of Adaptive Machine Systems, Graduate School of Engineering,
Osaka University, Japan

LA-2 Active Vibration Control of Drum Type of Washing Machine using Linear Oscillatory Actuator

Yuki Suzuki, Katsuhiko Hirata, Masayuki Kato

Department of Adaptive Machine Systems, Graduate School of Engineering,
Osaka University, Japan

LA-3 Prediction and Prevention of Losing Steps in a Helical Teethed Linear Actuator

Masahiko Sakai¹, Katsuhiko Hirata¹, Yoshihiro Nakata²

¹Department of Adaptive Machine Systems, Graduate School of Engineering, Osaka University, Japan,

²Department of Systems Innovation, Graduate School of Engineering Science, Osaka University, Japan

LA-4 Development of a Noncontact Impact Relieving Device of a Falling Object by Electromagnetic Impulsive Force

Satoshi Ueno, Takahiro Hiroi, Toshiro Higuchi, Changan Jiang
Ritsumeikan University, Japan

LA-5 Performance Improvement of a Linear Permanent Magnet Gear

Xin-Yuan Xu, Yong-Tao Tan, Yun-Chong Wang, Jian-Xin Shen

Department of Electrical Engineering, Zhejiang University, China

Oral 2A: Linear Motor 2

Time: Sep. 7th: 16:00-17:15

Location: Room 1

Chair: Prof. Y. Li (Chinese Academy of Sciences)

Chair: Prof. N. Niguchi (Osaka Univ)

LM-6 Design Analysis of a Segment Type Linear Switched Reluctance Motor

Tsuyoshi Higuchi¹, Yuichi Yokoi¹, Takashi Abe¹, Naoki Yasumura¹,
Yasuhiro Miyamoto², Shogo Makino²

¹Nagasaki University, Japan,

²Yaskawa Electric Corporation, Japan

LM-7 Consideration of Linear Synchronous Motor Characteristic in Curved Part

Shogo Makino¹, Masanobu Kakihara¹, Masayuki Hirayama¹, S. Tanaka¹,
Toru Shikayama¹, Tsuyoshi Higuchi², Takahi Abe²

¹Yaskawa Electric Corporation, Japan,

²Nagasaki University, Japan

LM-8 Development of High-Acceleration Linear Motor System using the Transient Loss Evaluation

Yu Hasegawa, Yasuaki Aoyama

Research and Development Group, Hitachi, Ltd., Japan

Oral 2B: Electromagnetic and Force Fields

Time: Sep. 7th: 16:00-17:15

Location: Room 2

Chair: Prof. Z. Q. Zhu (U. of Sheffield)

Chair: Dr. T. Murai (Central Japan Railway)

EM-1 Modeling and Experimental Validation of Field Distributions due to Eddy Currents in Slitted Conducting Plates

C.H.H.M. Custers, J.W. Jansen, E.A. Lomonova

Electromechanics and Power Electronics, Eindhoven University of Technology, The Netherlands

EM-2 Analytical Modelling Techniques for Thrust Force Calculation of a Permanent Magnet Linear Motor

E.A. Lomonova, S.R. Aleksandrov, D.C.J. Krop, D.T.E.H. van Casteren, T.T. Overboom,

Electromechanics and Power Electronics Group, Department of Electrical Engineering, Eindhoven University of Technology, The Netherlands

EM-3 Dynamical Model of an Electromagnet by Cauer Ladder Network Representation of Eddy-Current Fields

Yuji Shindo¹, Akihisa Kameari², Kengo Sugahara³, Tetsuji Matsuo⁴

¹Kawasaki Heavy Industries, Ltd., Japan,

²Science Solutions International Laboratory, Inc., Japan,

³Faculty of Science and Engineering, Kindai University, Japan,

⁴Graduate School of Engineering, Kyoto University, Japan

Oral 3A: Levitation Technologies

Time: Sep. 8th: 10:25-12:30

Location: Room 1

Chair: Prof. E. A. Lomonova (Eindhoven UT)

Chair: Prof. S. Ueno (Ritsumeikan Univ.)

LT-1 Magnetically Levitated Planar Positioning Systems Based on Lorentz Forces

Mousa Lahdo¹, T. Ströhla², S. Kovalev¹

¹Department of Information Technology, Electrical Engineering and Mechatronics, University of Applied Sciences Mittelhessen, Germany,

²Department of Mechatronics, Ilmenau University of Technology, Germany

LT-2 Improvement of Average Velocity Error in the HTS Magnetically Levitated Conveyance System

Hayato Sasaki, Takuro Sumida, Yuta Takaki, Shunsuke Ohashi

Department of Electrical and Electric Engineering, Kansai University, Japan

LT-3 Compact Maglev Motor with Full DOF Active Control for Miniaturized Rotary Blood Pumps

Masahiro Osa¹, Toru Masuzawa¹, Ryoga Orihara¹, Eisuke Tatsumi²

¹Ibaraki University, Japan,

²National Cerebral and Cardiovascular Center Research Institute, Japan

LT-4 Zero-Power Control of Flux-path Control Magnetic Suspension System with Flux-interrupting Plates

Takeshi Mizuno, Masaya Takasaki, Masayuki Hara, Daisuke Yamaguchi, Yuji Ishino

Department of Mechanical Engineering, Saitama University, Japan

LT-5 Performance Improvement of a Bearingless Motor by Rotation about an Estimated Center of Inertia

Junichi Asama¹, Tomotaka Shibata¹, Takaaki Oiwa¹, Tadahiko Shinshi², Akira Chiba²

¹Shizuoka University, Japan,

²Tokyo Institute of Technology, Japan

Oral 3B: Transportation

Time: Sep. 8th: 10:25-12:30

Location: Room 2

Chair: Prof. Qinfen Lu (Zhejiang Univ.)

Chair: Mr. J. Kitano (Central Japan Railway)

TP-1 The Development of Criteria for Evaluating Energy Efficiency and the Choice of the Optimal Composition of the Subsystems in the Russian Integral Transit Transport System

B.A. Lyovin¹, A.M. Davydov¹, P.V. Kurenkov¹, I.V. Karapetyants¹, V.G. Shavrov², V.V. Koledov², S.V. Fongratovski², G.G. Malinetskiy³, P.V. Kryukov⁴, B.V. Drozdov⁵, Yu.A. Terentiev⁶

¹Russian University of Transport (MIIT), Russia,

²Kotelnikov Institute of Radio-engineering and Electronics of RAS, Russia,

³Keldysh Institute of Applied Mathematics, Russia,

⁴Central Research Institute of Machine Building, Russia,

⁵Institute of Information-Analytical Technology, Russia,

⁶an independent expert

TP-2 Development of Ironless Halbach Permanent Magnet Linear Synchronous Motor for Traction of a Novel Maglev Vehicle

Ke Wang^{1,2}, Qiongxuan Ge¹, Liming Shi¹, Yaohua Li^{1,2}, Zhihua Zhang¹

¹Key Laboratory of Power Electronics and Electric Drive, Institute of Electrical Engineering, Chinese Academy of Sciences, China,

²University of Chinese Academy of Sciences, China

TP-3 Technical Challenges to Realize Energy-Efficient Linear Metros in Japan

Takafumi Koseki¹, Shoichiro Watanabe², Takeru Miura¹, Takeshi Mizuma³, Eisuke Isobe⁴

¹Department of Electric Engineering and Information Systems, School of Engineering, The University of Tokyo, Japan,

²National Traffic Safety and Environment Laboratory, Japan,

³Department of Advanced Energy, School of New Frontier Sciences, The University of Tokyo, Japan,

⁴Japan Subway Association, Japan

TP-4 Maglev Trends in Public Transport: The Perspectives of Maglev Transportation Systems

Johannes Kluehspies

The International Maglev Board, Germany

TP-5 Development of a Test Stand for Maglev Vehicles Using Hardware-in-the-Loop Simulation

Masashi Kabutomori¹, Toshiaki Murai¹, Shuichiro Ota¹, Yoshiaki Terumichi²

¹Chuo Shinkansen Promotion Division, Central Japan Railway Company, Japan,

²Department of Engineering and Applied Sciences, Sophia University, Japan

Oral 4A: Trends and New Developments of Linear Drives

Time: Sep. 8th: 14:00-15:15

Location: Room 1

Chair: Prof. N. Misron (U. Putra Malaysia)

Chair: Prof. T. Higuchi (Nagasaki Univ)

TD-1 Novel Oscillatory Actuator for Haptic Device using Principle of Stepper Motor

Masataka Yasukawa, Katsuhiko Hirata, and Masayuki Kato

Department of Adaptive Machine Systems, Graduate School of Engineering,
Osaka University, Japan

TD-2 Design of Linear Synchronous Generator Suitable for Free-Piston Engine Linear Generator System

Yuichiro Yamanaka¹, Masami Nirei², Mitsuhide Sato³, Hironobu Murata¹,
Yinggang Bu¹, Tsutomu Mizuno¹

¹Shinshu University Faculty Engineering, Japan,

²National Institute of Technology, Nagano College, Japan,

³Nagano Prefectural Institute of Technology, Japan

TD-3 Study of Linear Vernier Motor for Household Automatic Doors

Daichi Kameda, Katsuhiko Hirata, Noboru Niguchi

Department of Adaptive Machine Systems, Graduate School of Engineering,
Osaka University, Japan

Oral 4B: Control Methods for Linear Drives

Time: Sep. 8th: 14:00-15:15

Location: Room 2

Chair: Prof. L.M. Shi (Chinese Academy of Sciences)

Chair: Prof. T. Mizuno (Saitama Univ)

CT-1 Fault-tolerant oriented control of modular linear switched-flux permanent magnet machine

Zhiqiang Zeng, Qinfen Lu

College of Electrical Engineering, Zhejiang University, China

CT-2 Examination of a Free-Piston Engine Linear Generator System with Generation Control for High Efficiency

Mitsuhide Sato^{1,2}, Masami Nirei³, Yuichiro Yamanaka¹, Hironobu Murata¹,
Yinggang Bu¹, Tsutomu Mizuno¹

¹Shinshu University Faculty of Engineering, Japan,

²Nagano Prefectural Institute of Technology, Japan,

³National Institute of Technology, Nagano College, Japan

CT-3 Modeling and Control of an Active Magnetic Bearing with Four Poles and Coupled Magnetic Fluxes

Christian. Tshizubu¹, José Andrés Santisteban^{1,2}

¹Graduate Program in Mechanical Engineering, Universidade Federal Fluminense, Brazil,

²Graduate Program in Electrical and Telecommunications Engineering, Universidade Federal Fluminense, Brazil

Oral 5A: Other Related Topics and New Technologies

Time: Sep. 8th: 15:30-16:45

Location: Room 1

Chair: Prof. W. Xu (Huazhong U. Science Tech.)

Chair: Prof. T. Nakagawa (Tokyo City Univ.)

OT-1 Prototype of Magnetic Energy Harvesting Device as a 3.3 V Battery

Genki Itoh¹, Kuniyoshi Tashiro¹, Hiroyuki Wakiwaka¹, Takao Kumada²,
Kenichi Okishima²

¹ Shinshu University, Japan,

² Fuji Electric Co., Ltd., Japan

OT-2 Magnetic Field Performance of Round Layout Linear Halbach Array using Cylinder-shaped Permanent Magnets

Haruhiko Suzuki¹, Mizuki Sato¹, A. I. M. Hanafi², Yusuke Itoi¹,
Shigekazu Suzuki¹, Atsushi Ito¹

¹National Institute of Technology, Fukushima College, Japan,

²Institut Universitaire de Technologie de Brois, France

OT-3 Operating Characteristic of Matrix Converter for Linear Induction Motor

Aiko Kubota, Satoshi Ueno, Kouichi Tomiyoshi, Toshimitsu Morizane,
Hideki Omori, Noriyuki Kimura

Osaka Institute of Technology, Japan

Oral 5B: Materials

Time: Sep. 8th: 15:30-16:45

Location: Room 2

Chair: Prof. C. B. Part (K. N. U. T.)

Chair: Dr. Y. Shindo (Kawasaki Heavy Ind.)

MT-1 Basic Study on Linear Actuator Using Superconducting Coil

Mochimitsu Komori, Haruka Sagara, Ken-ichi Asami, Nobuo Sakai
Department of Applied Science for Integrated System Engineering, Kyushu
Institute of Technology, Japan

MT-2 Experimental Study on Iron Loss Properties of an Amorphous Ring under Different Inverter Excitations

Atsushi Yao, Kouhei Tsukada, Keisuke Fujisaki
Department of Advanced Science and Technology, Toyota Technological
Institute, Japan

MT-3 3-D Magnetic Field Analysis Taking Account of Anisotropic Magnetic Hysteresis Property of Electrical Steel Sheet

Shunya Odawara¹, Keisuke Fujisaki¹, Michihiro Nakagawa², Nobuki Kitano²,
Yoshinari Asano²

¹Kitami Institute of Technology, Japan,

²Technology Research Association of Magnetic Materials for High-Efficiency
Motors (MagHEM), Japan

Poster Sessoin

Time: Sep. 7th: 14:00 - 15:40

Location: Room P

Chair: Prof. J. Asama (Shizuoka U.)

Chair: Prof. H. Suzuki (National Inst. Tech. Fukushima College)

Chair: Prof. J. Kluehspies (Int. Maglev. B.)

Chair: Prof. C. B. Lee (Korean National University of Transportation)

P-01 Thrust Ripple Reduction Method of Inner Magnet Linear Synchronous Motor

Haruka Hirano, Shunji Tahara, Kokichi Ogawa

Department of Architecture and Mechatronics, Oita University, Japan

P-02 Design Parameter Analysis of the Linear Induction Motor for Maglev Conveying System

Wooyoung Ji¹, Geochul Jeong², Juntae Kim³, Ju Lee², Hyung-Woo Lee¹

¹Department of Railway Vehicle System Engineering, Korea National University of Transportation, Korea,

²Department of Electrical Engineering, Hanyang University, Korea,

³Department of Computer Science and Engineering, Dongguk University, Korea

P-03 Investigation of Single-Sided Ironless Linear Synchronous Motor Based on Permanent Magnet Halbach Array Used for Medium-Speed Maglev

Zihua Zhang, Liming Shi, Qiongquan Ge, Yaohua Li

Key Laboratory of Power Electronics and Electric Drive, Institute of Electrical Engineering, Chinese Academy of Sciences, China

P-04 Detent Force Reduction for a Novel Transverse Flux Permanent Magnet Linear Synchronous Motor without Compromising Stroke Length

Salman Ahmed, Takafumi Koseki, Hounng-Joong Kimy

Department of Electrical Engineering and Information Systems, The University of Tokyo, Japan

P-05 Design Analysis of a Line-Start Permanent Magnet Liner Synchronous Motor

Soei Akita¹, Tsuyoshi Higuchi¹, Yuichi Yokoi¹, Takashi Abe¹,
Toshimitsu Shirotani¹, Shogo Makino²

¹Nagasaki University, Japan,

²Yaskawa Electric Corporation, Japan

P-06 Improvement of Evitation Characteristics by the Drive Circuit in the Magnetically Levitated Conveyance System using the Linear Stepper Motor

Ibuki Watano, Reoto Tamaki, Shunsuke Ohashi

Department of Electrical and Electric Engineering, Kansai University, Japan

P-07 Study on Design Method for Thrust Ripple Reduction of Double-sided Linear Switched Reluctance Motor

Tadashi Hirayama, Shuma Kawabata

Graduate School of Science and Engineering, Kagoshima University, Japan

P-08 Experimental Confirmation of Thrust and Attractive Force Control for Linear Induction Motor by Two Different Frequency Components

Kenta Sannomiya, Toshimitsu Morizane, Noriyuki Kimura, Hideki Omori

Osaka Institute of Technology, Japan

P-09 Linear Oscillatory Actuator Integrated with Magnetic Gear for E-cutter Development

Norhisam Misron, Umair Zamil, Shehu Salihu Mustafa

Department of Electrical and Electronic Engineering, Faculty of Engineering,
Universiti Putra Malaysia

P-10 Increasing the Force per Unit Volume of Tubular Drives by Raising the Integration Degree

Quirin Maurus, W.-R. Canders, M. Henke

Institute for Electrical Machines, Traction and Drives (IMAB) Technische
Universität Braunschweig, Germany

P-11 The Study of Parallel Synchronous Drive in Permanent magnet Linear Synchronous Motor

Takahiro Inagaki, Kenji Suzuki, Hideo Dohmeki
Tokyo city university, Japan

P-12 Analysis of Indirect Field Oriented Control in Long Primary Parallel-connected Double-sided Linear Induction Motor

Xiao Sun^{1,2}, Liming Shi¹, Zihua Zhang¹, Yaohua Li¹

¹Key Laboratory of Power Electronics and Electric, Institute of Electrical Engineering, Chinese Academy of Sciences, China,

²University of Chinese Academy of Sciences, China

P-13 Sensorless Method with Parameter Identification Applied to a Bistable Fast Linear Switched Reluctance Actuator for Textile Machine

Faguy Tamwo Simo, Douglas Martins Araujo, Yves Perriard
Ecole Polytechnique Fédérale de Lausanne (EPFL) Integrated Actuators Laboratory (LAI), Switzerland

P-14 Precise Positioning Control of a Linear Induction Motor Drive System by Utilizing Nonlinear Friction Behaviors

Shun Nakauchi¹, Shigeru Futami², Toshiko Nakagawa¹

¹Tokyo City University, Japan,

²System's Function Laboratory Co. Ltd., Japan

P-15 Gap-Sensor-less Electromagnetic Suspension System using Force Sensor

Kyohei Maruyama, Susumu Torii
Department of Electrical and Electronic Systems Engineering, Tokyo City University, Japan

P-16 Influence of the HTS Volume in the Magnetic Bearing using Pinning Effect

Takahiro Minami, Shinichiro Sakai, Shota Hiraoka, Shunsuke Ohashi
Dept. of Electrical and Electric Engineering, Kansai University, Japan

P-17 Stable Magnetic Levitation of 0.1-mm-thick Steel Plate as Supreme Thickness in Our Study

Taiki Takada, Toshiki Kimura, Toshiko Nakagawa
Department of Electrical and Electronic Engineering, Tokyo City University,
Japan

P-18 Characteristics Comparative Study According to the Field Magnet Type in the Coreless-typed LSM for High-Speed Train

Chan-Bae Park¹, Hyun-June Park², Geochul Jeong³
¹Korea National University of Transportation, Korea,
²Korea Railroad Research Institute, Korea,
³Hanyang University, Korea

P-19 Improvement of the Damping factor by the Weight Reduction Damper coil in Superconducting Magnetically Levitated Bogie

Tomohiro Takeuchi, Takaaki Okubo, Eitaro Shin, Shunsuke Ohashi
Department of Electrical and Electric Engineering, Kansai University, Japan

P-20 Load Characteristics of a Magnetically Levitated System with Hybrid Magnets

Kouki Takata, Toshio Kakinoki, Ryouta Murakami, Hitoshi Yamaguchi,
Hiroyuki Nishi
Sojo University, Japan

P-21 Study of the Effect of Load Torque on the Iron Losses of Permanent Magnet Motors by Finite Element Analysis

Nicolas Denis, Yenyi Wu, Shunya Odawara, Keisuke Fujisaki
Toyota Technological Institute, Japan

P-22 Local Magnetic Characteristics of Electrical Motor Core by Magnetic Hysteresis Analysis with Inverter Excitation

Shunya Odawara, Keisuke Fujisaki
Toyota Technological Institute, Japan

P-23 Evaluation on the Effect of Space Factor of Motor on Torque Characteristics

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P-24 Iron Loss Characteristics under PWM Inverter Excitation at High Ambient Temperatures

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P-25 Improvement of the Magnetic Circuit of the Rotor using the Halbach Array and Iron in the HTS Magnetic Bearing

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P-26 Arbitrarily Close Equilibrium Orientations of Magnetically Levitated Platforms

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P-27 Evaluation System of Reactor Iron Loss under PWM Inverter Excitation

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