“Modelling and control using ENERGETIC MACROSCOPIC REPRESENTATION”
Application to hybrid electric vehicles and others

13th – 15th June 2018

Centre for Technology Innovation
Hanoi University of Science and Technology
1 Dai Co Viet Road, Hanoi, VIETNAM
www.emrwebsite.org

JOINT ORGANIZATION

Hanoi University of Science and Technology
VIETNAM

University of Lille
FRANCE

PROGRAM

SCIENTIFIC SUPPORTS

FINANCIAL SPONSOR
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:00</td>
<td>Welcome and registration (meeting Hall)</td>
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<tr>
<td>08:30</td>
<td>Welcome session - Introduction</td>
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<td></td>
<td><em>Prof. Huynh Quyet Thang, Vice-President Hanoi University of Science and Technology, Vietnam,</em></td>
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<td><em>Prof. Alain Bouscayrol, chair IEEE-VTS VPP TechCom (University of Lille, L2EP, MEGEVH, France)</em></td>
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<td><em>Prof. Ta Cao Minh, Director of Centre of Technology Innovation (Hanoi Univ. S&amp;T, Vietnam)</em></td>
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<td>09:00</td>
<td>Tea break and Photo Group</td>
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<td><strong>Oral session 1: From the causality to the EMR – From the EMR to the control</strong> (Session chair: Prof. Ruben Gonzalez-Rubio, University of Sherbrooke, Canada)</td>
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<tr>
<td>09:30</td>
<td>1.1 - &quot;Energy and causality&quot;</td>
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<td><em>Prof. Alain Bouscayrol</em>, (University of Lille, L2EP, France), <em>Prof. C.C. Chan (Univ. Hong-Kong, China)</em>, <em>Prof. Philippe Barrade (University of Applied Sciences of Sion, Switzerland)</em></td>
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<tr>
<td>10:00</td>
<td>1.2 - &quot;Energetic Macroscopic Representation&quot;</td>
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<td><em>(Prof. Alain Bouscayrol, Prof. Betty Lemaire-Semail (University of Lille, L2EP, France), Prof. Loic Boulon (University of Quebec at Trois-Rivières, Canada)</em></td>
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<td>10:30</td>
<td>1.3 - &quot;Inversion-based control&quot;</td>
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<td>*Prof. Alain Bouscayrol (University of Lille, L2EP, France), <em>Prof. João P. Trovão (University of Sherbrooke, Canada)</em>, <em>Prof. Pierre Sicard (University of Quebec at Trois-Rivières, Canada)</em></td>
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<td>11:00</td>
<td>Tea break and Photo Group</td>
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<td><strong>Oral session 2: Basic examples</strong></td>
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<td><em>(Session chair: Dr. Nguyen The Cong, Hanoi University of Science and Technology, Vietnam)</em></td>
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<td>11:30</td>
<td>2.1 - &quot;EMR and inversion-based control of an electric vehicle&quot;</td>
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<td>*(Dr. Walter Lhomme (University of Lille, L2EP, France), *Prof. Ta Cao Minh (Hanoi University of Sciences &amp; Technology, CTI, Vietnam), <em>Prof. Alain Bouscayrol (University of Lille, L2EP, France)</em></td>
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<td>12:00</td>
<td>2.2 - &quot;EMR and inversion-based control of a renewable energy conversion system&quot;</td>
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<td>*Dr. Philippe Delarue, Dr. Walter Lhomme (University of Lille, L2EP, France), Dr. Ngac-Ky Nguyen, (Arts&amp;Métiers ParisTech, L2EP, France), <em>Prof. Alain Bouscayrol (University of Lille, L2EP, France)</em></td>
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<td>13:00</td>
<td>Lunch -- Canteen 2nd floor, D2A Building</td>
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<td><strong>Simulation session 1: Modelling, Introduction to simulation</strong></td>
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<td><em>(1 case study to choose among the following)</em></td>
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<td>14:30</td>
<td>Group 1 &quot;Electric vehicle using EMR and Simulink™: part 1, EMR&quot; (EV)</td>
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<td><em>(Abdoulaye Pam et al., Univ. Lille), VDZ meeting hall, module 1</em></td>
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<td>14:30</td>
<td>Group 2 &quot;Wind energy conversion system using EMR and Simulink™: part 1, EMR&quot; (WECS)</td>
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<td><em>(Anatole Desreveaux et al., Univ. Lille), VDZ room 205</em></td>
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<td>14:30</td>
<td>Group 3 &quot;Photovoltaic system using EMR and Simulink™: part 1, EMR&quot; (PV)</td>
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<td><em>(Bao-Huy Nguyen et al., Univ. Sherbrooke &amp; Univ. Lille), VDZ meeting hall, module 2</em></td>
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<td>18:00</td>
<td>End of day 1 --</td>
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**Thursday June 14th** : "EMR and applications" (part I)  (VDZ Centre)

**Oral session 3: Applications to Hybrid Electric Vehicles**

*Co-organized by MEGEVH & VPP-TechCom*

(Session chair: Dr. R. German, Univ. Lille1, MEGEVH, France)

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| 09:00 | **3.1 - "EMR and control for reduced-scale HIL of H-ESS Electric Vehicle"**
|       | Bao Huy Nguyen, Prof. João P. Trovão, (University of Sherbrooke, e-TESC, Canada), Dr. Ronan German, Prof. Alain Bouscayrol (University of Lille, L2EP, MEGEVH, France) |
| 09:30 | **3.2 - "EMR and control of an electric vehicle for analysis of driver behaviour"**
|       | Anatole Desreveaux, Prof. Alain Bouscayrol (University of Lille, L2EP, MEGEVH France), Dr. Rochdi Trigui (LTE-IFSTTAR, MEGEVH, France, Dr. Elodie Castex (University of Lille, TVES. France) |
| 10:00 | **3.3 - "EMR and control of a hybrid vehicle for study of modelling assumption"**
|       | Abdoulaye Pam, Philippe Fiani, (Sherpa Engineering, MEGEVH, France), Prof. Alain Bouscayrol, - (University of Lille, L2EP, MEGEVH, France) |
| 10:30 | **Tea break** |

**Oral session 4: other applications**

(Session chair: Prof. Nguyen Quang Dich, Hanoi University of Science and Technology, Vietnam)

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| 11:00 | **4.1 - " EMR and control of an open-winding multiphase drives with two storage sources "**
|       | Dr. Ngac-Ky Nguyen, Prof. Eric Semail, (Arts&Métiers ParisTech, L2EP, France) |
| 11:30 | **4.2 - "EMR of Tire-Road Interaction for Modeling of Electric Vehicles"**
|       | (Bao-Huy Nguyen, Dzung Nguyen, Vo-Duy Thanh, Prof. Ta Cao Minh (CTI, Hanoi University of Science & Technology, Vietnam) |
| 12:00 | **4.3 - "EMR and control of an autonomous house"**
|       | Jules Voisin, Prof. João P. Trovão, Vincent Aimez (University of Sherbrooke, Canada) |
| 12:40 | **4.4 - From EMR Pictograms to uC programming using Java”**
|       | Prof. Ruben Gonzalez-Rubio, Prof. João P. Trovão (University of Sherbrooke, Canada) |
| 13:00 | **Lunch** -- Canteen 2nd floor, D2A Building -- |

**Simulation session 2: Inversion-based control, Introduction to simulation**

(the participants will complete the case study they have chosen the day before)

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<tr>
<th>Time</th>
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| 14:30 | **"Electric vehicle using EMR and Simulink™: part 2, EMR"** (EV)
|       | (Duc Tan Vu et al., A&MParisTech) VDZ meeting hall, module 1 |
| 14:30 | **"Wind energy conversion system using EMR and Simulink™: part 2, EMR"** (WECS)
|       | (Anatole Desreveaux et al., Univ. Lille), VDZ room 205 |
| 14:30 | **"Photovoltaic system using EMR and Simulink™: part 2, EMR"** (PV)
|       | (Bao-Huy Nguyen et al., Univ. Sherbrooke & Univ. Lille) VDZ meeting hall, module 2 |
| 18:00 | **End of day 2** -- |
**Friday June 15th**: "EMR and applications" (part II)  (VDZ Centre)  

**Oral session 5: Application to Electric Vehicles**  
Co-organized by MEGEVH & VPP-TechCom  
(Session chair: João P. Trovão, University of Sherbrooke, IEEE-VTS, VPP TechCom, Canada)  

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<th>Time</th>
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<th>Speaker/Details</th>
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| 09:00 | 5.1      | “Fuzzy Control for Braking Force Distribution in EVs”  
Ha-Huy Giap, Prof. Ta Cao Minh (CTI, Hanoi University of Science & Technology, Vietnam) |
| 09:30 | 5.2      | "EMR of a battery multi-physical model for electric vehicle"  
Dr. Ronan German, Prof. Alain Bouscayrol (University of Lille, L2EP, MEGEVH, France), Prof. Pascal Venet, Dr. Ali Sari (University of Lyon, AMPERE, MEGEVH, France) |
| 10:00 | 5.3      | "EMR and control of a hybrid electric truck for design comparison"  
Bảo-Huy Nguyễn, Prof. João P. Trovão (University of Sherbrooke, e-TESC, Canada), Dr. Ronan German, Prof. Alain Bouscayrol (University of Lille, L2EP, MEGEVH, France), Yves Goulet (ENER6 Inc., Canada) |
| 10:30 |          | Tea break      |

**Oral session 6: electric drives**  
organized by CE2I  
(Session chair: Prof. Betty LEMAIRE-SEMAIL,  
Director of CE2I program, University of Lille, L2EP, France)  

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<tr>
<th>Time</th>
<th>Session</th>
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| 11:00 | 6.1      | "EMR and control of IPM machines for electric vehicles"  
(N. Dinh An, T. Hoang Thanh, Prof. Ta Cao Minh (CTI, Hanoi University of Science & Technology, Vietnam) |
| 11:30 | 6.2      | "EMR of and inversion-based control of a seven-phase BLDC PMSM drive"  
Tan Duc Vu, Dr. Ngac-Ky Nguyen, Prof. Eric Semail, (Arts & Métiers ParisTech, L2EP, France) |
| 12:00 | 6.3      | "EMR and control of a fault tolerant dual-motor electric drive"  
Dr. Tiago Dos Santos Moraes, Dr. Ngac-Ky Nguyen, Prof. Eric Semail (Arts et Métiers ParisTech, L2EP, France). |
| 12:30 | 6.4      | “EMR and control of a Double Planetary Gear hybrid truck”  
Dr. Walter Lhomme, Prof. Alain Bouscayrol (University of Lille, L2EP, France). |
| 13:00 |          | Lunch         |

**Simulation session 3: Simulation and Results Analysis**  
(the participants will complete the case study they have chosen the day before)  

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<tr>
<th>Time</th>
<th>Group</th>
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| 14:30 | 1     | "Electric vehicle using EMR and Simulink™: part 3, EMR" (EV)  
(Abdoulaye Pam et al., Univ. Lille) VDZ meeting room, module 1 |
| 14:30 | 2     | "Wind energy conversion system using EMR and Simulink™: part 3, EMR" (WECS)  
(Ronan Germa et al., Univ. Lille), VDZ room 205 |
| 14:30 | 3     | "Photovoltaic system using EMR and Simulink™: part 3, EMR" (PV)  
(Bao-Huy Nguyen et al., Univ. Sherbrooke & Univ. Lille) VDZ meeting room, module 2 |
| 17:00 |       | Closing Ceremony, (VDZ Meeting Hall) |
| 18:00 |       | End of day 3      |
EMR’18 General Chair: Prof. Ta Cao MINH (Hanoi University S&T, CTI, Vietnam)
EMR’18 General Co-Chairs: Prof. Alain BOUSCAYROL (Université Lille1, L2EP, France)
Dr. Ngac-Ky NGUYEN (Art&Métiers ParisTech, L2EP, France)

WebMaster: Abdoulaye PAM (Université Lille, L2EP, France)
Simulation Chair: Anatole DESREVEAUX (Université Lille, L2EP, France)

Registration and information: http://www.emrwebsite.org/
Venue: Hanoi University of Science and Technology
1 Dai Co Viet road, Hanoi, Vietnam

Lecture: VDZ Building, room: Meeting Hall
Simulation sessions: VDZ Building, rooms: Meeting Hall (2 modules) and No.205
Lunch: Canteen 2nd floor, D2A Building
Wi-Fi access
A free Wi-Fi is available for EMR’18 attendees will be available during the summer school.

Access to the Campus de Hanoi University of Sciences & Technology:
https://goo.gl/maps/rokLx4YJzhM2