

CURRICULUM VITAE

Mohammad Reza Nikzad



Personal Information

Name: Mohammad Reza Nikzad

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Education

- PhD student in Electrical Engineering (Power Electronics), University of Tehran, Tehran, Iran, from Sep. 2011 (ongoing).
- M.Sc. in Electrical Engineering (Power Electronics), Khaje Nasireddin Tousi University of Technology (KNTU), Tehran, IRAN, Sep. 2005 till Aug. 2008 (GPA: 17.42/20)
- B.Sc. in Electrical Engineering (power engineering), Khaje Nasireddin Tousi University of Technology (KNTU), Tehran, IRAN, Sep. 2000 till Sep. 2005
- High School Diploma, Shahid Beheshti, under the supervision of NODET (National Organization for Developing Exceptional Talents), khorram abad, IRAN, Jun. 2000

Experience

1- Teaching Experience

- Lecturer in the Department of Engineering, Azad University, Khorram abad, Iran, since 2008.

Undergraduate Courses

- *Industrial Electronic*
- *Electrical Machines Analysis (DC and AC)*
- *Special Machines Analysis*
- *Electrical Circuit Analysis*

2- Collaborating with Iranian automakers 2003-2005

Theses

M.Sc. Thesis: voltage evaluation and control strategy for dc-link in parallel hybrid electric vehicles. (Sep. 2006 till Aug. 2008)

Abstract of M.Sc. Thesis

Nowadays, hybrid electric vehicles (HEVs) are known as a suitable solution to increase fuel economy and reduce gas pollution in conventional vehicles. Manufacturers assign a high portion of HEVs in the world markets to parallel hybrid electric vehicles (PHEVs). Battery pack, power electronic devices and electric motor are considered the most important parts of the electric power train in PHEVs. In this work, some attempts have been done to evaluate dc-link voltage level and extract an optimum control strategy for dc-link to increase electric drive train efficiency in parallel hybrid electric vehicles.

The main objectives of this project were:

1. The basic concept of hybrid traction was established first. Then, various configurations of HEVs were discussed.
2. A proper methodology was presented to size the battery pack in every capacity for parallel HEVs.
3. Cable designing and the battery safety voltage levels were examined.
4. The characteristics of the power electronic converters used in HEV applications were examined
5. A precise methodology was introduced to model and calculate both the dc/dc converter and traction inverter losses in PHEVs. The significant losses that were considered in the study include the diode and IGBT losses consist of the switching and conduction losses, for both the dc/dc converter and traction inverter as well as inductor losses for the dc/dc converter. The proposed model was validated by comparison with the published loss curves by the manufacturer.
6. The derived models were used to examine the effects of the battery pack and DC link voltage level on the dc/dc converter and traction inverter efficiencies. Depending on the electric power train structure, two strategies were introduced to control the DC link voltage.
7. After simulations the best structure and DC link voltage control were extracted for the vehicle under study.

B.Sc. Thesis: overview of power electronic converters and energy storage systems in Hybrid electric vehicles (Granted by Iran Kodro Car Company). (Sep. 2003 till May. 2005)

Research Interests

Electric, Electric Hybrid, and fuel cell vehicles

Power electronic converters Topology and Control

Power electronic converters Loss modeling

Electric motor drives

Battery and ultra capacitor energy storages

Soft switching techniques

Publications

Journal Papers

1. **Mohammad Reza Nikzad**, Ahmad Radan, "Comprehensive Analysis of Interior Permanent Magnet Synchronous Motor Drive in Directly Connected Battery-Inverter, Parallel Hybrid Electric Vehicles", *International Review of Electrical Engineering (IREE)*, 2009.Vol. 4. n. 4, pp. 564-569.
2. **Mohammad Reza Nikzad**, Ahmad Radan, "Effects of Battery Pack Voltage Level on Traction Inverter Efficiency in Parallel Hybrid Electric Vehicles", *International Review on Modeling and Simulations*, 2009.Vol. 2. n. 3, pp. 264-268.
3. **Mohammad Reza Nikzad**, "Examination battery design parameters in parallel Hybrid electric vehicle"(to be published) *Iranian Journal of Electrical and computer engineering* .(in Persian)
4. **Mohammad Reza Nikzad**, "Effects of the Battery Pack Increasing Size on Vehicle Performance, Fuel Consumption, Cost, and Battery Calendar Life in Parallel Hybrid Electric Vehicles"(to be published) *IEEE Transactions On Vehicular Technology*.

Conference Papers

1. **M.R. Nikzad**, A. Radan, "Accurate Modeling of Traction Inverter Losses for Efficiency Calculation in Parallel Hybrid Electric Vehicles", *13th European Conference on Power Electronics and Applications 2009, EPE '09*, Page(s): 1 – 7, Barcelona, Spain.

2. **M.R. Nikzad**, A. Radan, "Effects of Fuel Cell and DC-Link Voltage on Boost Converter Efficiency in Fuel Cell-Battery Hybrid Vehicles", *IEEE 6th International Power Electronics and Motion Control Conference, 2009. IPEMC '09*, Page(s): 2313 – 2317, Wuhan, China.
3. **M.R. Nikzad**, A. Radan, "Accurate Loss Modeling of Fuel Cell Boost Converter and Traction Inverter for Efficiency Calculation in Fuel Cell-Battery Hybrid Vehicles", *1st IEEE Power Electronic & Drive Systems & Technologies Conference (PEDSTC), 2010*, Page(s): 218 – 223, Tehran, Iran.
4. **M.R. Nikzad**, A. Radan, "Hybrid Electric Vehicles: The State of The Art", *11th ISCEE, Zanjan university, Zanjan, Iran, Sep 2008*. (in Farsi)
5. **M.R. Nikzad**, S.M.T Bathaee, "A Comparison Between Hybrid Electric and Electric Vehicles", *7th ISCEE, KNT university of technology, Tehran, Iran, Sep 2004*. (in Farsi)

Selected Seminars

- "Accurate Loss Modeling of Fuel Cell Boost Converter and Traction Inverter in Fuel Cell-Battery Hybrid Vehicles", Tarbiat Modares University, Tehran, Iran, 2010.
- "Dynamic Simulation for Analysis of Fuel Cell Hybrid Electric Vehicle", K.N.Toosi University of Tech., Tehran, Iran, 2007.
- "Permanent Magnetic Synchronous Motors", K.N.Toosi University of Tech., Tehran, Iran, 2006.
- "Hybrid Electric Vehicles", K.N.Toosi University of Tech., Tehran, Iran, 2005.

Computer Skills

- CAD Tools: Matlab, Simulink, Advanced Vehicular Simulator (ADVISOR), ORCAD, PSIM, PSCAD
- General Packages: MS-Word, Excel, PowerPoint, Visio

References

Behzad Asaei, School of Electrical & Computer Engineering Dept, University of Tehran, Tehran, Iran (Email: basaei@ut.ac.ir)

Dr. Ahmad Radan, Associated Professor of Electrical Engineering Dept, K.N.Toosi University of Tech, Tehran, Iran (Email: Radan@kntu.ac.ir)

Dr.S.M.T.Bathaee, Associated Professor of Electrical Engineering Dept, K.N.Toosi University of Tech, Tehran, Iran (Email: bathaee@kntu.ac.ir).