KHIEM DUC TRONG HUYNH

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EDUCATION

Master of Science in Electrical Engineering May 2018
Old Dominion University, Norfolk, Virginia

Bachelor of Science in Electrical-Electronics Engineering December 2016
Old Dominion University, Norfolk, Virginia

RESEARCH INTERESTS

Electromagnetic applications, Antenna theories and applications, Transformer designs and applications, and Internet of Things (IOT).

TEACHING INTERESTS

Fundamental Circuit Analysis, Intelligent Machines, and Electrical Engineering Design.

EXPERIENCE

- Director Assistant at 6M Insulation Company – Vietnam – June 2018 – Present
- Head of R&D Department at 6m Insulation Company- Vietnam – June 2018 - Present
- Teaching Assistant, Electrical and Computer Engineering Department - Old Dominion University – 2017 - 2018
- Research Assistant, Frank Reidy Research Center for Bioelectrics – 2016 - 2018
- Teaching Assistant, Mechanical and Aerospace Engineering Department - Old Dominion University – 2015 - 2017
- Research Assistant, Marine Lab – 2013 - 2015
- Lab Assistant, Foreign Language – 2012 - 2014

TEACHING EXPERIENCE

Intelligent Machines (MAE/ECE 495) - Fall 2015, Spring 2016, Fall 2017, Spring 2017

- Developed syllabus, and teaching materials.
- Contributed three projects for this course: Path Tracking, Object Detection, and Mapping Robots
- Three projects were used as a guide for this course.

Electrical Engineering Design (ECE 485W) – Fall 2017, Spring 2018

- Construct and analysis H-bridge model for the course.
- Developed teaching material for H-bridge.
- Graded students' papers and projects.

- Organized teaching materials

Fundamental Circuit Analysis (ECE201) – Spring 2018
- Graded students' projects in Matlab and Pspice
- Tutoring students, and giving guidance for projects.

RESEARCH EXPERIENCE

Frank Reidy Research Center for Bioelectrics (2 years)
- Dual Resonant Transformer
- Dielectric Antenna
- Antenna Theories and Development
- Picosecond Pulses Regime
- Applied Electromagnetic Field Applications in vivo and vitro

Marine Lab (2 years)
- Autonomous Surface Vehicle (ASV)
- Computer Vision
- Sensors Optimization

PUBLICATION

- Shu Xiao, Xianbing Zou, Ross Petrella, Enbo Yang, **Khiem Huynh** (forthcoming). Development of a High Power Dielectric Antenna for Delivery of Picosecond Pulses

THESIS

Thesis Defended: April 24, 2018
Dissertation Committee: Shu Xiao, Shirshak Dhali. Yucheng Zhang

A Dual Resonant Transformer and a Dielectric Antenna for Picosecond Pulse Radiation

This thesis discusses the development of a pulsed power system for high power picosecond pulse radiation. In the system, a charging transformer, which generates a high voltage pulse of ~100 kV, can be used for charging a transmission line in less than 100 ns. Such a short pulse could cause a peak gap switch to break down and generate a picosecond pulse transient for radiation. A dielectric antenna, if fed with the high voltage picosecond pulses, can radiate them to targets made of high dielectric materials. Biological tissues, for instance, can be targeted for electrostimulation.

The transformer was designed considering the needs to deliver a high gain and fast output. We showed that a transformer in the dual resonant mode, in which the resonance of the primary and the second is equal, can produce a voltage gain of approximately 6. The output voltage of the transformer is more than 100kV with an input of 15kV. This shows the average gain of the transformer is 7. The fast output requires the voltage at the secondary winding needs to be less than 100 ns in order for achieving a picosecond transient in the oil peak switch. This was done by low-inductance windings with an air core. Two winding configurations were explored: a cylindrical winding and a toroidal winding. The cylindrical winding appears to be a better option in terms of the gain. Experimental results show that for a capacitive load (30pF), the voltage can be charged up to 33 kV in 20 ns.

A conical dielectric antenna was investigated through simulation and experiments. The antenna is made of a V-shape transmission line on a ceramic conical body with dielectric constant of 28. This antenna was immersed in transformer oil for high voltage insulation, which allowed for the feed voltage to be as high as 50 kV. The antenna was characterized by an electric field sensor

immersed in water. We found that the emitted field increases as the voltage increases, but it reaches a saturation for 40 kV. The highest electric field is 1.5 kV/cm even for the input voltage 50 kV. This is 6 times less than simulation. We speculate that the discrepancy is caused by the dielectric tangent loss, which was not taken into account in the simulation.

Future work towards a complete system includes a choice of a linear dielectric material which is capable of sustaining its dielectric constant for a high electric field and the study of an oil peak switch, which is a critical component between the transformer and the antenna.

COMPUTER SKILLS

Proficient in statistical analysis and software (CST Studio, SigmaPlot, Pspice, Multisim)

REFERENCES

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