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Effective Teaching and Learning Outcomes through Visual Complex Content of Electromagnetic Fields and Waves

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Abstract

This paper highlights the significance of utilizing the digitally shared and visual complex examples through simulators or aids to enhance the teaching and learning process of Electromagnetic (EM) concepts and reflections on promoting EM education. Integration of engineering EM with preparatory mathematics and physics course can be an option with close collaboration between engineering, mathematics and physics faculty. This traditional course as a background is so essential in effective understanding of the trends and challenges as part of wired and wireless communications stream. Looking to the perspectives of student attention span, possibly impatient and distractions of modern times, the teacher enthusiasm is of primary importance in EM education. However, there is a need for replacing the traditional teaching with learning EM from rigorous mathematical perspective, with the help of modern software tools. Conceptual insight, historical context, access to National Digital Library, experimental demonstrations (with animations), student presentations, video based learning materials are essentially useful as supplement to conventional learning. Students though always link courses with their employment relevance, preparation of improved teaching learning with suitable framework help bringing students reasonably close to state of art.

Keywords

3D animation tools, Mentoring, Complex mathematics, Handbook, National Digital Library

Biographies

B R Sanjeeva Reddy received his ME degree in Microwaves from Government College of Engineering, Pune, India and his PhD degree from National Institute of Technology, Warangal, India in the field of multiband antennas. Currently working as Professor at B V Raju Institute of Technology, Narsapur Medak and his areas of interest include Computational Electromagnetics, wearable antennas and metamaterials. He has good command on calibrating the vector network analyzer and constructional operation of Anechoic Chamber and its usage in testing wireless components.

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Rayudu Katuri completed his B.Tech. in Electrical and Electronics Engineering (EEE) from Jawaharlal Nehru Technological University (JNTU) College of Engineering, Kakinada, Andhra Pradesh in 1999. M.Tech, (Information Technology in Power Engineering) from Jawaharlal Nehru Technological University (JNTU) College of Engineering, Hyderabad, Andhra Pradesh, India, in 2004 and completed Ph.D. in Optimal Reactive power Dispatch using GA, ACO, ABC and BAT Algorithms (under Power Systems area of specialization) from Jawaharlal Nehru Technological University Hyderabad (JNTUH) College of Engineering, Hyderabad,Telangana,India in 2018. He has 20 years of teaching experience. He has worked as faculty (Teaching Assistant) at JNTU College of Engineering, Hyderabad and is presently working as Professor & Head, EEE Dept., B V Raju Institute of Technology (BVRIT), Narsapur, Medak District,Telangana,India. He has 12 International and National Journals to his credit. He has 22 International and National papers published in various conferences held in India. His research interests are Artificial Intelligence applications to Power Systems, Reactive Power Dispatch, Voltage Stability, Computer Applications to Power Systems, Smart Grids & Microgrids and Distributed Generation. He is a Life Member of ISTE,FIE,SESI and IEEE.

Samanasa Krishna Rao is the Professor and Head of the Civil Engineering Department at B V Raju Institute of Technology (BVRIT), with 23 years of experience in teaching, research, and industrial consultancy. He earned his B.Tech from Bapatla Engineering College in 1998, M.Tech from S.G.S.I.T.S. Indore in 2000, and Ph.D. from JNTU Hyderabad in 2016. Dr. Rao has a distinguished academic career, having served as an Associate Professor at Velagapudi Ramakrishna Siddhartha Engineering College for 12 years and as an Assistant Professor at Bapatla Engineering College for six years. Before joining BVRIT, he was the Professor and Head of the Civil Engineering Department at Vignana Bharathi Institute of Technology from 2017 to 2022, where he also held roles as Director (Academic and Planning) and Principal (In-Charge). He has published over 45 research papers, authored two books, and is a reviewer for leading international journals. Dr. Rao is a life member of the Indian Roads Congress (IRC) and the Institution of Urban Transport (India). He also provides consultancy services in traffic and transportation engineering, pavement design, and material testing for government and private organizations, contributing significantly to infrastructure projects across Andhra Pradesh.

M Udaykiran is pursuing his B.Tech III year in Mechanical engineering at BVRIT Narsapur. His interests are thermal engineering and computational dynamics.