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Engineering Academics' Strategies of Modelling Mathematical Concepts into Their Teaching of an Antenna Design

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Abstract : An Antenna, which remains the hub of technological development in Africa had been found to be a course that is been taught and designed in an abstract manner in some universities. One of the reasons attached to this is that the appropriate approach of teaching antenna design is not yet understood by many engineering academics in some universities in South Africa. Also, another problem reported is the main difficulty encountered when interpreting and applying some of the mathematical concepts learned into their practical antenna design course. As a result of this, some engineering experts classified antenna as a mysterious technology that could not be described by anybody using mathematical concepts. In view of this, this paper takes it as its point of departure in explaining what an antenna is all about with a strong emphasis on its mathematical modelling. It also argues that the place of modelling mathematical concepts into the teaching of engineering design cannot be overemphasized. Therefore, it explains the mathematical concepts adopted during the teaching of an antenna design course, the Strategies of modelling those mathematics concepts, the behavior of antennas, and their mathematics usage were equally discussed. More so, the paper also sheds more light on mathematical modelling in South Africa context, and also comparative analysis of mathematics concepts taught in mathematics class and mathematics concepts taught in engineering courses. This paper focuses on engineering academics teaching selected topics in electronic engineering (Antenna design), with special attention on the mathematical concepts they teach and how they teach them when teaching the course. A qualitative approach was adopted as a means of collecting data in order to report the naturalistic views of the engineering academics teaching Antenna design. The findings of the study confirmed that some mathematical concepts are being modeled into the teaching of an antenna design with the adoption of some teaching approaches. Furthermore, the paper reports a didactical-realistic mathematical model as a conceptual framework used by the researchers in describing how academics teach mathematical concepts during their teaching of antenna design. Finally, the paper concludes with the importance of mathematical modelling to the engineering academics and recommendations for further researchers.

Keywords : modelling, mathematical concepts, engineering, didactical, realistic model
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