

University teachers' perspectives about difficulties for engineering students to understand the Laplace transform

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The Laplace transform is an important tool in many branches of engineering, for example in electric and control engineering. In the thesis of Margarita Holmberg¹ it was concluded that the Laplace transform is one of the most difficult topics in learning electric circuit theory.

We have made individual interviews with 22 university teachers from five different universities in three countries. Questions such as “what is the importance of the Laplace transform in engineering education?”, “what are the difficulties for students to learn the Laplace transform?”, “what is the use of the Laplace transform to solve real world?” and “what is the importance for students future profession?” were asked and the answers were transcribed and analysed. It is striking that the teachers did not have a unified view neither on the difficulties for learning nor on the importance of the Laplace transform.

Further the teachers were asked on their views on how the aspects of *mathematics*, *physics* and *technology/application* were related in the process of learning the Laplace transform. We have developed a method for illustrating the responses on this question that we call “diagram of relations”. Such diagrams will be presented from the analysis of answers from five teachers representing very different views.

Although many different and sometimes conflicting views were expressed in this study we claim that our study show that in teaching the Laplace transform it is important to focus on its application and to teach it as a separate topic seems to make it an obstacle for learning.

¹ González Sampayo, M. (2006). Engineering Problem Solving: The case of the Laplace transform as a difficulty in learning electric circuits and as a tool to solve real world problems. Linköping: Linköping Studies in Science and Technology Dissertation No. 1038.