

Extended Abstract

The use of fuzzy controller to predict student test scores

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Introduction

In the references concerning mathematical education one of the most important processes is the educational assessment. The process of mathematics assessment is usually measured with knowledge and skills. But in the process of teaching and learning mathematics the attitudes and beliefs towards mathematics and corresponding teaching tools and teaching materials used by the teachers are also very important.

For the teachers working at the University the most important is the students' assessment. The students' motivation, learning styles, learning outcomes, and satisfaction in achieving good results are all very welcome during the learning process. In order to measure such attitudes and beliefs it is appropriate to use fuzzy set theory.

In this paper the Fuzzy theory is applied for the purpose of mathematics assessments. The students' data are gathered and analyzed. First, the Fuzzy ToolBox of the software package MathLab is applied to build a fuzzy decision making system in order to obtain prescribed scores and to compare it with the real final scores. This result can be implemented in didactics research, because the input factors had different kind of numbers: exact numbers - representing results of pre-test and final scores, linguistic labels fuzzy numbers representing the attitude to mathematics and the use of teaching materials and tools books, computers, in particular software packages.

The obtained results of data represent contributions both to the application of fuzzy decision making system and to students' assessment. In the future the authors are supposed to apply the obtained fuzzy decision making system to predict student scores at the beginning of the course in order to motivate students to work appropriately in their learning process.

Methods

We had started our research were done with 202 students, but we finished with 176 first year sciences students at the Faculty of Sciences, University of Novi Sad. We lost 26 students, that be treated as a common number getting out their studies in different cases. Let us remark that all students were very motivated to take part in our research.

At the first lecture of our course the students got pre-test consisting of 10 mathematical tasks, and 6 points was maximum for each task.

Besides the usual measuring of students' mathematical knowledge and skills (pre-test), the authors were interested in students' attitudes and beliefs of mathematics, in particular of using teaching materials, computers for learning. These input factors are consider, by authors, as relevant ones for assessment in the learning process of the compulsory mathematical contends in our course.

Results and Discussion

Let us denote the following parameters: the results RP, the results RFT, attitudes to mathematics by AM, attitudes to computers by AC, attitudes to booksby AB, attitudes to t *GeoGebra* column by AG, the main results of predicted scores *PSCRS*. Analyzing the differences between the predicted scores *PSCRS* and the final scores RFT it is obvious that they are really very small, not bigger the 9 points (except in 7 in 44 cases). It can be concluded that we are able to predict the students assessment in learning mathematics, expressed by final marks, for almost all students. Students who had more then 55 points passed the exam and the difference between the predicted and final score was less then 9, within one mark. Students who had less than 55 points, did not pass exams but the difference was less than 9.

Let us remark that mean value of difference is 5.47 and the median is 4.20.

Conclusions

The authors consider that the possibility of predicting the students marks at the beginning of our mathematical course can be useful for the students to get real picture of their possible mathematical assessment, and it can be an additional external factor of motivation for them to plan their learning of mathematics.

By the use of fuzzy set theory it can be concluded, in the didactic point of view that besides the knowledge expressed by the results pre-test, the mentioned attitudes and reliefs contributes to the students assessments.

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References and Notes

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