POVZETEK

V diplomski nalogi predstavimo definicijo integriranja, ki namesto na konstrukciji z Riemannovimi vsotami, temelji na dveh aksiomih, aksiomu aditivnosti in aksiomu asimptotične lastnosti. V drugem poglavju definiramo nekaj osnovnih pojmov, ki jih bomo v nadaljevanju potrebovali za boljše razumevanje. V tretjem poglavju je predstavljena aksiomatična definicija določenega integrala. Na osnovi teh aksiomov je izpeljan tudi dokaz o obstoju določenega integrala, v katerem uporabimo Riemannove vsote. V zadnjem poglavju diplomske naloge je prikazano, kako na osnovi predstavljenih aksiomov izpeljemo nekatere znane integralske formule. Pri izpeljavi ne uporabimo Riemannovih vsot.

Ključne besede: Riemannov integral, določeni integral, osnovni izrek analize

ABSTRACT

The purpose of this thesis is to present the definition of integration which is is not based on a construction with Riemann sums but rather on two axioms, axiom of additivity and axiom of asymptotic property. In the second chapter we define some basic terms, which serve for better understanding of the subject presented in this thesis. In the third chapter axiomatic definition of a definite integral is presented. Based on these axioms the proof of the existence of a definite integral, where Riemann sums are used, is derived. In the last chapter we derive some known formulas for integration, based on the two axioms. For the derivation of these formulas, Riemann sums are not used.

Keywords: Riemann integral, definite integral, fundamental theorem of analysis

Math. Subj. Class. (2010): 26A42

Literatura

[1] R. Cavalcante., Todor. D. Todorov, *A Lost Theorem: Definite Integrals in an Asymptotic Setting*, The American Mathematical Monthly, Vol. 115, Iss. 1: 45–56 (2008).

[2] I. Vidav, *Višja matematika I*, Društvo matematikov, fizikov in astronomov Slovenije, Ljubljana (1994).

[3] J. Globevnik.,M. Brojan, *Analiza I*, dostopno na naslovu [`http://www.fmf.uni-lj.si/~globevnik/skripta.pdf`] (dostop april 2016).

[4] J. Cimprič, *Integrali*, dostopno na naslovu [`http://www.fmf.uni-lj.si/~cimpric/skripta/del3.pdf`] (dostop april 2016).

[5] S. Lang, *A First Course in Calculus*, 5th ed., Springer-Verlag New York Inc. (1986)

[6] H. J. Keisler, *Elementary Calculus: An Infinitesimal Approach*, 2nd ed., University of Wisconsin (2000)