ZMATH 2016e.00984

Yang, Yajun; Gordon, Sheldon P.

Numerical integration: one step at a time.

PRIMUS, Probl. Resour. Issues Math. Undergrad. Stud. 26, No. 5, 371-392 (2016).

Summary: This article looks at the effects that adding a single extra subdivision has on the level of accuracy of some common numerical integration routines. Instead of automatically doubling the number of subdivisions for a numerical integration rule, we investigate what happens with a systematic method of judiciously selecting one extra subdivision for the succeeding iteration. We outline the numerical criterion for both Riemann sums and the Trapezoidal Rule, respectively. Two kinds of integrands where this technique is very effective are considered: as a computational tool and more importantly as a way to increase student understanding.

Classification: N45 I55
Keywords: numerical integration; Riemann sums; trapezoidal rule; adaptive methods of integration
doi:10.1080/10511970.2015.1127300