Contribution ID: **1323** Type: **Oral**

Calculation of a multidimensional integral with a singularity by dividing the integration domain into subsegments

Monday 30 October 2023 14:50 (15 minutes)

Calculating multidimensional integrals with a singularity of type 1/(x-c) is not a simple task. The methods used to calculate such an integral must effectively bypass the singularity, minimizing the error. This work presents an algorithm that, in the process of calculating the integral, analyzes the area of integration, dividing it into subsegments. Subsegments containing a singularity, as well as those located close to the singularity, are excluded during the final calculation of the integral. Integrals final calulation is carried out using the Monte Carlo integration method. The algorithm allows to calculate both one-dimensional and multidimensional integrals.

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Session Classification: Mathematical Modeling and Computational Physics

Track Classification: Mathematical Modeling and Computational Physics