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### Division by zero calculus and singular integrals

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Singular integral equations are presently encountered in a wide range of mathematical models, for instance in acoustics, fluid dynamics, elasticity and fracture mechanics. Together with these models, a variety of methods and applications for these integral equations has been developed. However, what are singular integrals and why do appear singular integrals in many discontinuity phenomena? For singular integrals, we will consider their integrals as divergence, however, the Hadamard finite part or Cauchy's principal values give finite values; that is, from divergence values we

will consider finite values; for this interesting property, we will be able to give a natural interpretation by the division by zero calculus. We would like to give some essential answers for those questions by the division by zero calculus that was born from the division by zero. In talk, we will introduce our recent results on the division by zero calculus and formulas  $\log 0 = \log \infty = 0$  that were obtained from the division by zero  $z/0 = 0$  and we will give the interpretation for the Hadamard finite part of singular integrals and Cauchy's principal values by means of the division by zero calculus.

### Biography

Tsutomu Matsuura majored in mathematical engineering at the University of Tokyo. His research field is applied mathematics, and now he teaches signal mathematical analysis at Gunma University. His most interested field of research is reproducing kernel theory and its application to inverse problems, and recently he is also studying the division by zero derived from those studies.

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