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### Division by zero calculus and applications

The common sense on the division by zero with a long and mysterious history is wrong and our basic idea on the space around the point at infinity is also wrong since Euclid. On the gradient or on differential coefficients we have a great missing since  $\tan(\pi/2) = 0$ . Our mathematics is also wrong in elementary mathematics on the division by zero. In this talk, we will show and give various applications of the division by zero  $0/0=1/0=z/0=0$ . In particular, we will introduce several fundamental concepts in calculus, Euclidean geometry, analytic geometry, complex analysis and differential equations. We

will see new properties on the Laurent expansion, singularity, derivative, extension of solutions of differential equations beyond analytical and isolated singularities, and reduction problems of differential equations. On Euclidean geometry and analytic geometry, we will find new fields by the concept of the division by zero. We will show many concrete properties in mathematical sciences from the viewpoint of the division by zero. We will know that the division by zero is our elementary and fundamental mathematics.

### Biography

Saburo Saitoh is a retired Professor Emeritus of Gunma University, Japan. He gained a major in the theory of reproducing kernels with many applications in analysis. His PhD thesis was titled "The Bergman norm and the Szegő norm", and these topics held a substantial influence on his future research. He has published over 170 original papers and his publications include Theory of Reproducing Kernels and its Applications (1988); Integral Transforms, Reproducing Kernels and their Applications (1997); Inverse Problems and Related Topics (2000); and Theory of Reproducing Kernels and Applications, Developments in Mathematics (2016).

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### Notes: