

# To divide by zero is to multiply by zero

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**Abstract.** A remark of the definition of division by zero is given.

The definition of division by zero in the real number field is given by [1]:

$$(1) \quad \frac{a}{0} = 0 \quad \forall a \in \mathbb{R}.$$

However it seems to be better to be understood to define division by zero as binary operation, i.e., the definition (1) should be explicitly written as follows:

$$\frac{a}{0} = a \cdot 0 \quad \forall a \in \mathbb{R}.$$

Therefore to divide by zero is to multiply by zero. In this case it seems to be appropriate to define  $0^{-1} = 0$  (just the definition of the notation  $0^{-1}$ ). Then division (including division by zero) can be expressed by

$$\frac{a}{b} = a \cdot b^{-1} \quad \forall a, \forall b \in \mathbb{R}.$$

In this sense we can consider that 0 is the inverse of 0 itself in a generalized sense.

## REFERENCES

- [1] M. Kuroda, H. Michiwaki, S. Saitoh, M. Yamane, New meanings of the division by zero and interpretations on  $100/0 = 0$  and on  $0/0 = 0$ , Int. J. Appl. Math., **27**(2) (2014) 191–198.