# Algebraical Entropy and Arrow of Time

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Usually, it is supposed that irreversibility of time appears only in macrophysics. Here, we attempt to introduce the microphysical arrow of time assuming that at a fundamental level nature could be non-associative. Obtaining numerical results of a measurement, which requires at least three ingredients: object, device and observer, in the non-associative case depends on ordering of operations and is ambiguous. We show that use of octonions as a fundamental algebra, in any measurement, leads to generation of unavoidable 18.6 bit relative entropy of the probability density functions of the active and passive transformations, which correspond to the groups G2 and SO(7), respectively. This algebraical entropy can be used to determine the arrow of time, analogically as thermodynamic entropy does [1].

References:

[1] M. Gogberashvili, "Algebraical Entropy and Arrow of Time", *Entropy* **24** (2022) 1522.