

What is special about the field of 5 elements?

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Inspired by the famous Cauchy functional equation, we ask the following question: For a field F , what are all functions f from F to F that satisfy the functional equation

$$f((x+y)/(x-y)) = (f(x) + f(y))/(f(x) - f(y))$$

for all $x \neq y$ in F ? We answered this question for various well-known fields of characteristic 0 and for fields algebraic over F_p . This work distinguishes F_5 among all fields of characteristic not equal to 2. This is joint work with Apoorva Khare and Anindya Sen.

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