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(54) Title: METHODS AND SYSTEMS FOR ADDITION, MULTIPLICATION, SUBTRACTION, AND DIVISION OF RATIONAL
NUMBERS ENCODED IN THE DOMAIN OF FAREY RATIONALS FOR MPC SYSTEMS

(57) Abstract: Disclosed are methods and systems to provide encoding and decoding using of p-adic arithmetic, and inverse p-adic
arithmetic, in the domain of Farey rationals that is induced by a ring isomorphism, such that said encoded integers preserve inverses,
and additive and multiplicative homomorphic properties. This encoding permits MPC systems to perform arithmetic more efficiently
and accurately, particularly for division.



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