

**LARGE DEVIATION PRINCIPLE FOR
ARITHMETIC FUNCTIONS IN
CONTINUED FRACTION EXPANSION**

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ABSTRACT. Khinchin proved that the arithmetic mean of continued fraction digits of Lebesgue almost every irrational number in $(0, 1)$ diverges to infinity. Hence, none of the classical limit theorems such as the weak and strong laws of large numbers or central limit theorems hold. Nevertheless, we prove the existence of a large deviations rate function which estimates exponential probabilities with which the arithmetic mean of digits stays away from infinity.

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