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Asymptotics of partial sums of the Dirichlet series of the arithmetic derivative. (English)

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Summary: Let $p \in \mathbb{P}$ and $s \in \mathbb{R}$, and suppose that $\emptyset \neq P \subset \mathbb{P}$ is finite. Given $n \in \mathbb{Z}_+$, let n' , n'_p , and n'_P denote respectively its arithmetic derivative, arithmetic partial derivative with respect to p , and arithmetic subderivative with respect to P . We study the asymptotics of

$$\sum_{1 \leq n \leq x} \frac{n'}{n^s}, \quad \sum_{1 \leq n \leq x} \frac{n'_p}{n^s}, \quad \text{and} \quad \sum_{1 \leq n \leq x} \frac{n'_P}{n^s}.$$

We also show that the abscissa of convergence of the corresponding Dirichlet series equals two.

MSC:

11N37 Asymptotic results on arithmetic functions

11N56 Rate of growth of arithmetic functions

Keywords:

abscissa of convergence; arithmetic derivative; Dirichlet series

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