



Volume 3, Issue 5, Article 73

A Monotonicity Property of the Gamma Function

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Keywords: Gamma function, Strictly completely monotone.
Date Received: 11/01/01
Date Accepted: 29/07/02
Subject Codes: 33B15
Editors: [Andrea Laforgia](#),

Abstract: It is shown that the function $x \mapsto 1 + \frac{1}{x} \ln \Gamma(x + 1) - \ln(x + 1)$ is strictly completely monotone on $(-1, \infty)$ and tends to one as $x \rightarrow -1$, to zero as $x \rightarrow \infty$. This property is derived from a suitable integral representation of $\ln \Gamma(x + 1)$.



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