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Inequalities for the Gamma Function

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Abstract: For $x > 1$, the inequalities

$$\frac{x^{x-\gamma}}{e^x-1} < \Gamma(x) < \frac{x^{x-1/2}}{e^x-1}$$

hold, and the constants γ and $1/2$ are the best possible, where $\gamma = 0.577215\dots$ is the Euler-Mascheroni constant. For $0 < x < 1$, the left-hand inequality also holds, but the right-hand inequality is reversed. This improves the result given by G. D. Anderson and S. -L. Qiu (1997).



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