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$|S - s_n| < a_{n+1}$, so we want $a_{n+1} \leq 0.001$

Now $a_{n+1} = \frac{1}{(n+1)!}$, so we want $\frac{1}{(n+1)!} \leq 0.001$,

i.e. $(n+1)! \geq 1000$

$n = 4$: $5! = 120 < 1000$
$n = 5$: $6! = 720 < 1000$
$n = 6$: $7! = 5040 > 1000$

So $n = 6$ is the smallest value of n to guarantee that $|S - s_n| < 0.001$.