

Math 414 Analysis II
Bonus Problem 3

Turn in by Wednesday March 3.

For which values $r \geq 0$ does the series $\sum_{n=1}^{\infty} \frac{r^n n!}{n^n}$ converge?

At some point in the proof it might be useful to know that

$$\ln((n-1)!) < \int_1^n \ln x \, dx < \ln(n!).$$

To prove this consider the partition $P = \{1, \dots, n\}$.