

PROBLEM 1. Find the radius of convergence of $\sum_{n=0}^{\infty} \frac{(2n)!}{(n!)^2} z^n$.

PROBLEM 2. Find the radius of convergence of $\sum_{n=0}^{\infty} \frac{(2n)!}{(n!)^2} z^{2n}$.

PROBLEM 3. Compute the radius of convergence of $\sum_{n=0}^{\infty} n! z^n$ and of $\sum_{n=0}^{\infty} \frac{z^n}{n!}$.

PROBLEM 4. Describe the region in the complex plane where the series $\sum_{n=1}^{\infty} \frac{(5z-2)^n}{n^2 4^n}$ converges. (Don't forget to check the boundary of the region.)

PROBLEM 5. What is the radius of convergence of the series $f(z) = \sum_{n=1}^{\infty} \frac{(-1)^n}{n} z^n$. What happens on the boundary of its disc of convergence?