

Math 4001 Analysis 2
Homework Set 4

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Problem 1: Consider the following series

$$\sum_{n=1}^{\infty} \frac{n^2}{n!}.$$

Prove that the series converges and determine its limit. (4P)

Problem 2: Determine the convergence radius for each of the following series:

a)

$$\sum_{n=1}^{\infty} \sqrt[n]{n} z^n,$$

b)

$$\sum_{n=k}^{\infty} \binom{n}{k} z^n.$$

(8P)

Problem 3: Determine the Taylor-expansion of the function

$$f(x) = \frac{1}{1+x^2}, \quad x \in \mathbb{R}$$

at $x_0 = 0$ and show that f is analytic. (4P)