

Improper Integrals

Integrals with infinite limits of integration are improper integrals of Type 1.

1.

2.

3.

In each case if the limit is finite we say that the improper integral

Tests for convergence and divergence

Direct Comparison Test –

1.

2.

Limit comparison test –

$$\int_1^{\infty} \frac{dx}{x^p}$$

$$\int_1^{\infty} \frac{dx}{x^{1.001}} =$$

Integrals of functions that become infinite at a point within the interval of integration are improper integrals of Type II.

1.

2.

3.

If the limit exists and is finite then it converges. If the limit does not exist then it diverges.

$$\int_0^4 \frac{dx}{\sqrt{4-x}} =$$

$$\int_{-8}^1 \frac{dx}{x^{\frac{1}{3}}} =$$

$$\int_0^2 \frac{x+1}{\sqrt{4-x^2}} dx$$

$$\int_{-\infty}^2 \frac{2dx}{x^2 + 4} =$$