

Calcolo di integrali impropri e serie

Si trovi per quali valori del parametro reale α risultano convergenti i seguenti integrali impropri

$$1. \int_0^{+\infty} \frac{1}{|x^x - 1|^\alpha} dx;$$

$$2. \int_0^{+\infty} \frac{1}{|x^{x^\alpha} - 1|} dx;$$

$$3. \int_0^{+\infty} \frac{1}{|x^x|^\alpha} dx;$$

$$4. \int_0^{+\infty} \frac{1}{|x^{x^\alpha}|} dx;$$

$$5. \int_0^{+\infty} \frac{1}{|x \ln(x^\alpha)|} dx;$$

$$6. \int_0^{+\infty} \ln^\alpha(x) dx;$$

$$7. \int_0^{+\infty} \left(1 - \frac{\sin(x)}{x}\right)^\alpha dx;$$

$$8. \int_0^{+\infty} 2^{-x^\alpha} dx;$$

$$9. \int_0^{+\infty} \frac{1 - 2^{-x}}{x^\alpha(1 + x^3)} dx;$$

$$10. \int_0^{+\infty} \frac{1 - \cos(x) + \ln(1 + x^4)}{x^\alpha(1 + x^2)} dx;$$