Formulario Analisi C

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1 Serie note

- Serie geometrica
$$\sum_{n=0}^{\infty} q^n \quad = \quad \frac{1}{1-q}$$
converge se $\mid q \mid < 1$

- Serie armonica generalizzata
$$\sum_{n=1}^{+\infty} \left(\frac{1}{n}\right)^{\alpha}$$
converge se $\alpha < 1$

- Serie
$$\sum_{n=2}^{+\infty} \frac{1}{n^{\alpha} \cdot (log\, n)^{\beta}}$$
converge se $\alpha > 1, \forall \beta$ oppure $\alpha = 1, \beta > 1$

2 Sviluppi di Taylor

$$
\begin{aligned}
\frac{1}{1-x} &= \sum_{n=0}^{+\infty} x^n & \text{per } \mid x \mid < 1 \\
e^x &= \sum_{n=0}^{+\infty} \frac{x^n}{n!} \\
log(1+x) &= \sum_{n=1}^{+\infty} (-1)^{n+1} \cdot \frac{x^n}{n} & \text{per } -1 < x \leq 1 \\
sin(x) &= \sum_{n=0}^{+\infty} (-1)^n \cdot \frac{x^{2n+1}}{(2n+1)!} \\
cos(x) &= \sum_{n=0}^{+\infty} (-1)^n \cdot \frac{x^{2n}}{(2n)!} \\
sinh(x) &= \sum_{n=0}^{+\infty} \frac{x^{2n+1}}{(2n+1)!} \\
cosh(x) &= \sum_{n=0}^{+\infty} \frac{x^{2n}}{(2n)!} \\
arctan(x) &= \sum_{n=0}^{+\infty} (-1)^n \cdot \frac{x^{2n+1}}{2n+1} & \text{per } \mid x \mid \leq 1 \\
arctanh(x) &= \sum_{n=0}^{+\infty} \frac{x^{2n+1}}{2n+1}
\end{aligned}
$$

3 Integrali impropri notevoli

$$\int_0^1 \left(\frac{1}{x}\right)^\alpha \qquad \text{converge se } \alpha < 1$$

$$\int_1^{+\infty} \left(\frac{1}{x}\right)^\alpha \qquad \text{converge se } \alpha > 1$$

$$\int_0^{\frac{1}{2}} \frac{1}{x^\alpha \cdot \mid log\, x \mid^\beta}\, dx \qquad \text{converge se } \alpha < 1 \quad \forall\beta$$

$$\text{oppure } \alpha = 1 \quad \beta > 1$$

$$\int_{a>1}^{+\infty} \frac{1}{x^\alpha \cdot \mid log\, x \mid^\beta}\, dx \qquad \text{converge se } \alpha > 1 \quad \forall\beta$$

$$\text{oppure } \alpha = 1 \quad \beta > 1$$