Analisi Matematica 1- Lista n. 9

Confronto di Infiniti

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In ciascuna delle terne di successioni proposte in seguito stabilire quali sono le successioni che hanno ordine di infinito più alto e più basso.

NON USARE STIRLING

1) $a_n = n^n$ $\quad b_n = (3n)^{1000}$ $\quad c_n = 1000^n$ $\quad \boxed{b_n = o(c_n) \quad c_n = o(a_n)}$

2) $a_n = \sqrt[10]{n}$ $\quad b_n = \log_7 n$ $\quad c_n = (\sqrt{2})^n$ $\quad \boxed{b_n = o(a_n) \quad a_n = o(c_n)}$

3) $a_n = (\ln 3)^n$ $\quad b_n = \sqrt{2n}$ $\quad c_n = (\ln n)^{10}$ $\quad \boxed{c_n = o(b_n) \quad b_n = o(a_n)}$

4) $a_n = (10^n)^2$ $\quad b_n = \sqrt{10^{n^2}}$ $\quad c_n = 10000^{\sqrt{n}}$ $\quad \boxed{c_n = o(a_n) \quad a_n = o(b_n)}$

5) $a_n = \ln(n^2+1)$ $\quad b_n = \ln(2n+5)$ $\quad c_n = \ln(2n^2+3)$ $\quad$ Tutti dello stesso ordine. In particolare a_n e c_n sono anche asintoticamente equivalenti.

6) $a_n = n^{n+1}$ $\quad b_n = n^n$ $\quad c_n = (n+2)!$ $\quad \boxed{c_n = o(b_n) \quad b_n = o(a_n)}$

7) $a_n = \ln\sqrt{n^2+1}$ $\quad b_n = \sqrt{\ln(n^2+1)}$ $\quad c_n = (\ln(1+\sqrt{n}))^2$ $\quad \boxed{b_n = o(a_n) \quad a_n = o(c_n)}$

8) $a_n = e^n$ $\quad b_n = e^n + n$ $\quad c_n = e^{n+\ln n}$ $\quad \boxed{a_n \approx b_n \quad b_n = o(c_n)}$

9) $a_n = \ln(n^n+1)$ $\quad b_n = n\sqrt{n}$ $\quad c_n = \dfrac{n}{(\log_n e)^2}$ $\quad \boxed{a_n = o(c_n) \quad c_n = o(b_n)}$

10) $a_n = \sqrt{n!+1}$ $\quad b_n = n^{\frac{n}{2}}$ $\quad c_n = \left(\frac{n}{2}\right)^n$ $\quad \boxed{a_n = o(b_n) \quad b_n = o(c_n)}$

11) $a_n = \left(1+\frac{2}{n}\right)^{n^2}$ $\quad b_n = 4^n$ $\quad c_n = 9^n$ $\quad \boxed{b_n = o(a_n) \quad a_n = o(c_n)}$

12) $a_n = (n^2)!$ $\quad b_n = (n!)^2$ $\quad c_n = n^{2n}$ $\quad \boxed{b_n = o(c_n) \quad c_n = o(a_n)}$

13) $a_n = n^{n+1}$ $\quad b_n = (n+1)^n$ $\quad c_n = (n!)^2$ $\quad \boxed{b_n = o(a_n) \quad a_n = o(c_n)}$

14) $a_n = n^n$ $\quad b_n = (n!)^2$ $\quad c_n = 2^{n^2}$ $\quad \boxed{a_n = o(b_n) \quad b_n = o(c_n)}$

15) $a_n = 2^{2^n}$ $\quad b_n = n^{n^2}$ $\quad c_n = (n!)^n$ $\quad \boxed{c_n = o(b_n) \quad b_n = o(a_n)}$

16) $a_n = 2^{\sqrt{n}}$ $\quad b_n = \sqrt{2^n}$ $\quad c_n = n^{\sqrt{n}}$ $\quad \boxed{a_n = o(c_n) \quad c_n = o(b_n)}$

17) $a_n = n^{\ln n}$ $\quad b_n = (\ln n)^n$ $\quad c_n = n^{\sqrt{n}}$ $\quad \boxed{a_n = o(c_n) \quad c_n = o(b_n)}$

18) $a_n = (n^n)^{n!}$ $\quad b_n = (n!)^{n^n}$ $\quad c_n = 2^{(n!)^2}$ $\quad \boxed{a_n = o(b_n) \quad b_n = o(c_n)}$