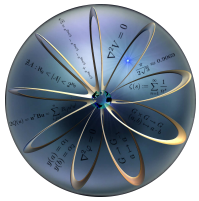

planetmath.org

Math for the people, by the people.

proof of Simultaneous converging or diverging of product and sum theorem

Canonical name	ProofOfSimultaneousConvergingOrDivergingOfProductAndSumTheorem
Date of creation	2013-03-22 13:35:57
Last modified on	2013-03-22 13:35:57
Owner	Johan (1032)
Last modified by	Johan (1032)
Numerical id	5
Author	Johan (1032)
Entry type	Proof
Classification	msc 30E20

From the fact that $1 + x \leq e^x$ for $x \geq 0$ we get

$$\sum_{n=1}^{m} a_n \leq \prod_{n=1}^{m} (1 + a_n) \leq e^{\sum_{n=1}^{m} a_n}$$

Since $a_n \geq 0$ both the partial sums and the partial products are monotone increasing with the number of terms. This concludes the proof.