

ON THE CONVERGENCE OF A SEQUENCE

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1. Introduction. Our aim is to investigate the convergence of the following sequence:

$$(1) \quad x_n = a^{a^{a^{\dots a}}}, \quad a \text{ occurs } n \text{ times}, \quad a > 0, \quad b \in \mathbb{R}, \quad n \geq 1.$$

Observing that it may also be defined by the recurrence

$$(2) \quad x_{n+1} = f(x_n), \quad n=0,1,2,\dots, \quad x_0 = b \in \mathbb{R}$$

where $f: \mathbb{R} \rightarrow \mathbb{R}$ denotes the exponential function $f(x) = e^x$, it is convenient to use proposition A or its variant B.

Some particular cases solved in a different way can be found for example in [3] ($a=b=\sqrt{2}$) and [4] ($a \in [1/e, 1], b \in \mathbb{R}$).