

$$f(x) = x^{x^{x^{x^{\dots}}}}$$

For what real numbers x does this function make sense? This question was first answered by Euler.

Clearly $f(2)$ is infinite, and one might guess that $f(x)$ is infinite for all x greater than 1. In fact this is not true: both the upper and lower bounds of f 's domain of definition are interesting. In this talk we will deduce these bounds using nothing more advanced than the chain rule. En route we will examine some well-known graphs ($y = a^x$) and some not-so-well-known graphs ($y = a^{a^x}$) closely, discovering some enjoyable surprises.