Napier 数とその比較

on December 4th, 2010

$$\lim_{x\to 0}(1+x)^{1/x} = \lim_{x\to\infty}\left(1+\frac{1}{x}\right)^x = e$$

で定まる実数 e を, 数学者 John Napier に因んで **Napier 数**とよぶ. Wikipedia から少し抜粋してみよう.

> The mathematical constant e is the unique real number such that the value of the derivative (slope of the tangent line) of the function $f(x) = e^x$ at the point $x = 0$ is equal to 1. The function e^x so defined is called the exponential function, and its inverse is the natural logarithm, or logarithm to base e. The number e is also commonly defined as the base of the natural logarithm (using an integral to define the latter), as the limit of a certain sequence, or as the sum of a certain series (see the alternative characterizations, below).
>
> The number e is irrational; it is not a ratio of integers. Furthermore, it is transcendental; it is not a root of any non-zero polynomial with rational coefficients. The numerical value of e truncated to 50 decimal places is
>
> 2.71828182845904523536028747135266249775724709369995...

以下に最初の関数のグラフを示す. 確かに $x = 0$ のときに上の値に近づいているのが分かる.

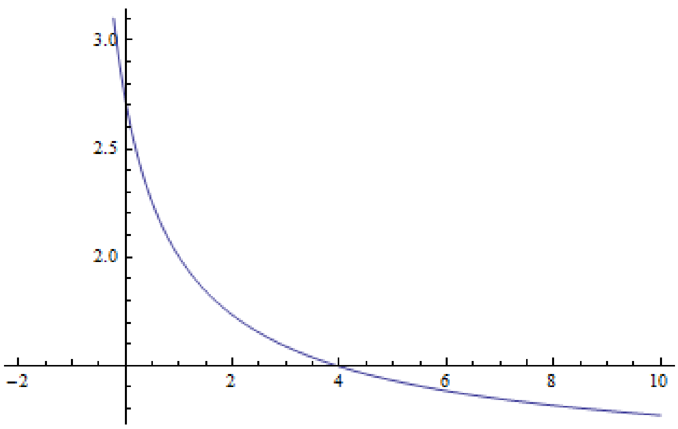

Figure. 関数 $f(x) = (1+x)^{1/x}$ のグラフ.