

## Re: A function shaped like...

---

*Source:* <http://sci.tech-archive.net/Archive/sci.math/2006-09/msg00534.html>

---

- *From:* Paul Abbott <[paul@xxxxxxxxxxxxxxxxxxxxxx](mailto:paul@xxxxxxxxxxxxxxxxxxxxxx)>
  - *Date:* Sun, 03 Sep 2006 22:50:32 +0800
- 

In article <MPG.1f5c100eb51e2eae9896de@xxxxxxxxxxxxxxxxxxxx>, Chris Smith <[cdsmith@xxxxxxx](mailto:cdsmith@xxxxxxx)> wrote:

I'm looking for an easily computable function for which all of the following are true:

1. The function is differentiable and monotonically increasing over all real numbers.
2.  $f(0) = 1/2$
3.  $\lim_{x \rightarrow \infty} f(x) = 1$
4.  $\lim_{x \rightarrow -\infty} f(x) = 0$

In addition to basic arithmetic, I can use forward trig functions and square roots.

I assume that you can use exponentials? If so, then

$$\text{Exp}[c x]/(1 + \text{Exp}[c x])$$

for any  $c > 0$  satisfies all your conditions.

Cheers,  
Paul

---

Paul Abbott Phone: 61 8 6488 2734  
School of Physics, M013 Fax: +61 8 6488 1014  
The University of Western Australia (CRICOS Provider No 00126G)  
AUSTRALIA <http://physics.uwa.edu.au/~paul>