Answer on Question #69563 – Math – Calculus

Question

How can I transform a surge function ($y = axe^{-bx}$) horizontally and vertically? Does a surge function have to go through the origin?

Solution

You can move the function $y = axe^{-bx}$ horizontally to the right by c units if x is changed into $x - c$ and to the left by c if x is changed into $x + c$

(here $c > 0$).

For example, the function

$$y = a(x - 4)e^{-b(x-4)}$$

moves $y = axe^{-bx}$ to the right by 4 units.

To move a function vertically up by c units you should add c (here $c > 0$).

To move a function vertically down by c units you should subtract c

(here $c > 0$).

For example, the function

$$y = axe^{-bx} + 6$$

moves $y = axe^{-bx}$ upward by 6 units.

The surge function $y = axe^{-bx}$ always goes through the origin unlike a transformed one.