Contents

0.1 Differentiating natural number power functions

0.1.1 Other

$\frac{\delta}{\delta x} x^n = \lim_{\delta \to 0} \frac{(x+\delta)^n - x^n}{\delta}$

$\frac{\delta}{\delta x} x^n = \lim_{\delta \to 0} \frac{(\sum_{i=0}^{n} x^i \delta^{n-i} \frac{n!}{i!(n-i)!}) - x^n}{\delta}$

$\frac{\delta}{\delta x} x^n = \lim_{\delta \to 0} \sum_{i=0}^{n-1} x^i \delta^{n-i-1} \frac{n!}{i!(n-i)!}$

$\frac{\delta}{\delta x} x^n = \lim_{\delta \to 0} x^{n-1} \frac{n!}{(n-1)!(n-n+1)!} + \sum_{i=0}^{n-2} x^i \delta^{n-i-1} \frac{n!}{i!(n-i)!}$

$\frac{\delta}{\delta x} x^n = n x^{n-1}$