Software Engineering Project Documentation

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0.1 Function x^y Description

The function describes about the x raised to the power of y. The term power was used by the Greek mathematician Euclid for the square of a line. The function is mainly used in the Tumor growth check, investments and calculate population growth.The function form is as follows

$$f(x, y) = x^y$$

0.1.1 Domain of function

The function domain is as follows
$(x, y) \in R^2 : x > 0$
that is, the set of all pairs (x, y) with x, y belonging to the extended real number line$R = [\text{-}\infty, +\infty]$ (assuming a real-valued function)

0.1.2 Codomain

The function allows one to define the powers x^y by continuity whenever $-\infty \leq x \leq +\infty, \infty \leq y \leq +\infty$, except for 0^0, $+\infty^0$, $1^{+\infty}$ and $1^{-\infty}$, which remain indeterminate forms [1] .

The codomain also lies between $R = [\text{-}\infty, +\infty]$
Therefore, the range of the function is set of real numbers

0.1.3 Characteristics and Calculations

1. The function for the integers can be calculated as follows
   x^y=x multiplied y times.
2. The function for the real numbers can be calculated as follows
   $e(ylogx)$

0.2 Requirements

1. The function takes the input of two real numbers computes the one number raised to other and gives the output.
2. The function should throw the proper and valid exception on error
3. The function should be calculated using basic arithmetic operators and give the ouput.

0.3 Assumptions

1. The domain and codomain is known and input and output will be in the range of domain and codomain

2. The calculated value shouldn't be underflow or overflow.

Bibliography

[1] wiki. *Exponentiation.*