

Problem 1 - SOEN 6011

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F7: Power Function

0.1 Introduction

A power function or exponentiation is of the form:

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

where x and y are real numbers.

0.2 Domain and Codomain

1. When y is a non-negative integer, the domain is all real numbers: $(-\infty, \infty)$
2. When y is a negative integer, the domain is all real numbers excluding zero $(-\infty, 0) \cup (0, \infty)$
3. When y is an irrational number and $y > 0$, the domain is all non-negative real numbers and when y is an irrational number and $y < 0$, the domain is all positive real numbers
4. The codomain of the function is $[-\infty, \infty]$ and can be indeterminate

0.3 Characteristics of Power Function.

1. The behaviour of the power function depends on whether the value of y is a positive or a negative and an odd or an even number
2. Also, the power function outputs differently for negative and positive fractional powers

References

- [1] "*Exponentiation*" https://en.wikipedia.org/wiki/Exponentiation#Power_functions
- [2] "*Fractional Exponents*" <https://www.mathsisfun.com/algebra/exponent-fractional.html>