

SOEN 6011

SOFTWARE PROCESSES

Problem 2 Express Requirements

Function $\sinh(x)$

Submitted By : 40035954

Jesus Onofre Diaz

<https://github.com/jonofre21>

July 12, 2019

Contents

1	Function Express Requirements	2
1.1	Functional Assumptions	2
1.2	Requirements	4
2	Acknowledgments	6

1 Function Express Requirements

This report aims to describe the $y = \sinh(x)$ function requirements and assumptions for a calculator application according to the ISO/IEC/IEEE 29148 standards. This function is expressed by the formula: $\sinh(x) = \frac{e^x - e^{-x}}{2}$ where e is constant value.

1.1 Functional Assumptions

- Assumption 1
 - ID: FUNA1
 - Version: 1.0
 - Type: functional
 - Owner: Jesus
 - PRIORITY: 1
 - Difficulty: Easy
 - DESC: Floating-point values are returned for floating-point arguments.
 - Rationale: when $x = 2.8$ $y = 8.19$
- Assumption 2
 - ID: FUNA2
 - Version: 1.0
 - Type: functional
 - Owner: Jesus
 - PRIORITY: 1
 - Difficulty: Easy
 - DESC: $y = \sinh(x) = 0$ when $x = 0$, this is due to the nature of the formula $\sinh(x) = \frac{e^x - e^{-x}}{2} = \frac{1-1}{2} = 0$ exact for finite x.
 - Rationale: $x = 0$

- Assumption 3
 - ID: FUNA4
 - Version: 1.0
 - Type: functional
 - Owner: Jesus
 - PRIORITY: 1
 - Difficulty: Easy
 - DESC: The $\sinh(x)$ curve is positive where e^x is large, and negative where e^{-x} is large.
 - Rationale: e^x and e^{-x}

1.2 Requirements

- Requirement 1
 - ID: FUNR1
 - Version: 1.0
 - Type: functional
 - Owner: Jesus
 - PRIORITY: 1
 - Difficulty: Easy
 - DESC: The arguments passed to the function $\sinh(x)$ shall be real numbers from $-\infty$ to $+\infty$ and they can be expressed in radians.
 - Rationale: when $x = 2.2$, $y = 4.45$ where x expressed in radians.
- Requirement 2
 - ID: FUNR2
 - Version: 1.0
 - Type: functional
 - Owner: Jesus
 - PRIORITY: 1
 - Difficulty: Easy
 - DESC: Euler's Number (e) is an irrational number which is a constant that has an approximate value of 2.71828, this value will be provided
 - Rationale: $(1 + 1/n)^n$ where $n > 0$ and $n \leq 1000$

- Requirement 3
 - ID: FUNR3
 - Version: 1.0
 - Type: functional
 - Owner: Jesus
 - PRIORITY: 1
 - Difficulty: Easy
 - DESC: Power function, this function will be calculated
 - Rationale: for an even number $a^b = (a^2)^b/2$ odd $a^b = a * (a^2)^b/2$ for negative number $a^{-n} = 1/a^n$
- Requirement 4
 - ID: FUNR4
 - Version: 1.0
 - Type: functional
 - Owner: Jesus
 - PRIORITY: 1
 - Difficulty: Easy
 - DESC: Absolute value function, this function will be calculated
 - Rationale: for any real number $|-n| = n$ and for $|0| = 0$

2 Acknowledgments

Professor P. Kamthan and his great group of teaching assistants for the material and guidance.

Bibliography

- [1] Encyclopedia Britannica. (2019). Hyperbolic functions — mathematics. [online] Available at: <https://www.britannica.com/science/hyperbolic-functions> [Accessed 12 Jul. 2019].
- [2] Hunsicker, E. (2019). <http://www.mathcentre.ac.uk/>. [online] Mathcentre.ac.uk. Available at: <http://www.mathcentre.ac.uk/resources/workbooks/mathcentre/hyperbolic-functions/> [Accessed 12 Jul. 2019].
- [3] Calculadora conversor, las mejores calculadoras online. (2019). Calcular seno hiperbólico online - Sus propiedades, fórmulas y más!. [online] Available at: <https://www.calculadoraconversor.com/seno-hiperbolico/> [Accessed 12 Jul. 2019].