# SOEN6011

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## 1 Introduction:

This document shows the basic understanding of the function $\sinh x$.

## 2 Function:

The hyperbolic sine function is

$$\sinh(x) = \frac{e^x - e^{-x}}{2} \tag{1}$$

$$e = \lim_{x \to \infty} (1 + \frac{1}{x})^x \tag{2}$$

e = 2.71828182 (approximately)

## 3 Domain and Range:

The domain of hyperbolic sine function is (-$\infty$, +$\infty$).
$The range of hyberbolic sine function is [-1, 1]$.

## 4 Characteristics:

- Sinh (-x) = -sinh x
- d/dx sinh (x) = cosh x
- For large positive x Sinh x = Cosh x
- For large negative x Sinh x = -Cosh x
- Sinh 2x = 2 sinh x cosh x
- Sinh x = – i sin(ix)

## 5 References:

## References

[1] http://www.mathcentre.ac.uk/resources/workbooks/mathcentre

[2] hyperbolicfunctions.pdf

[3] https://www.analyzemath.com/DomainRange/domain_range_functions.html