Problem 1

Name: Cheng Chen
ID:40222770
function: tan(x)
Concordia University
SOEN 6011: Software Engineering Processes 17 July 2022

1 Description

The function tan(x) is short for the tangent function, which is one of trigonometric functions(also called circular functions), which are real functions which relate an angle of a right-angled triangle to ratios of two side lengths. And it's widely used in all sciences that are related to geometry. [1]

1.1 Domain and co-domain of tan(x)

1. **Domain**: x:all real numbers except the values where $x = \pi/2 + k\pi, k \in Z$ (Since $tan(x) = sin(x)/cos(x)$, $cos(x) = 0$ when $x = \pi/2 + k\pi, k \in Z$. if $cos(x) = 0$,$tan(x)$ will be undefined.).
2. **Co-domain**: y:all real numbers, R (In mathematics, the codomain of a function is the set into which all of the output of the function is constrained to fall.[2])

1.2 Characteristics of tan(x)

1. $tan(x) = sin(x)/cos(x)$
2. period:π (For any given x, $tan(y) = tan(x)$ if $y = x + k\pi, k \in Z$
3. $x \to \pi/2 + k\pi, k \in Z, tan(x) \to +\infty$
4. $x \to 3\pi/2 + k\pi, k \in Z, tan(x) \to -\infty$

2 Context of use model

The model below is based on the guideline in IEEE Guide for Information Technology–System Definition–Concept of Operations (ConOps) Document. [3]

1. User: A user who is planning to use a calculator to calculate the output of $tan(x)$ with the input x.
2. Task: Calculate the output of $tan(x)$ with the input x and show the result in the screen of the calculator for the user.
3. Environment:

   Technical environment:

   - The power and quality of the used calculator/computer and any changes in the input.

   Non-technical environment:

   - The location where the user use the calculator/computer.

Referenties

[1] "Trigonometric functions". In: *Wikipedia* (2001), p. 1. DOI: `https://en.wikipedia.org/w/index.php?title=Trigonometric_functions&dir=prev&limit=500&action=history`.

[2] "Co-domain's definition". In: *Wikipedia* (2002), p. 1. DOI: `https://en.wikipedia.org/w/index.php?title=Codomain&dir=prev&action=history`.

[3] IEEE. *IEEE Guide for Information Technology—System Definition— Concept of Operations (ConOps) Document*. 1998, p. 1. DOI: `https://books.google.ca/books?id=Y3RCzAEACAAJ`.