Contents


```
% Name           : Kai Chuen Tan
% Title          : Homework 2
% Course         : CSE 276C: Mathematics for Robotics
% Professor      : Dr. Henrik I. Christensen
% Date           : 17th October 2021

clear all;
clc;

fprintf('Name           : Kai Chuen Tan\n')
fprintf('Title          : Homework 2\n')
fprintf('Course         : CSE 276C: Mathematics for Robotics\n')
fprintf('Professor      : Dr. Henrik I. Christensen\n')
fprintf('Date           : 17th October 2021\n\n')
fprintf('------------------------------------------------------------\n\n')
```

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------------------------------------------------------------
```

Problem 3 - Newton's Method

```
fprintf('Problem 3 - Newton''s Method \n')
% Given an equation x = tan (x). Find two solutions
% (upper and lower bounds) that are the nearest to x = 5.

% x = tan(x)
% 0 = x - tan(x)
% f(x) = x - tan(x)
% d(f(x))/dx = 1 - sec^2(x)

% Exact of x
x_exact = 5;
% Define x_k
x_k = (1:0.1:10);
% Define function of x
fx = @(x)x - tan(x);
% Define the 1st derivative of function x
dfx = @(x)1 - (sec(x))^2;
% Error Tolerance, e
error_tol = 1e-6;
% Maximum Iteration to quit the function
max_iter = 1000;
```

```
% Plot the graph to guess the location of the roots.
figure
fplot(fx, [0, 10]);
title('f(x) Plot')
xlabel('x')
ylabel('f(x) = x - tan(x)')
grid on

% Display two closest values.
fprintf("\nThe two solutions that are nearest to 5 are the following:\n")

% Call the Newton's Method to find two closet solutions
[x_1, x_2] = Newtons_Method(x_exact, x_k, fx, dfx, max_iter, error_tol)
```

```
Problem 3 - Newton's Method

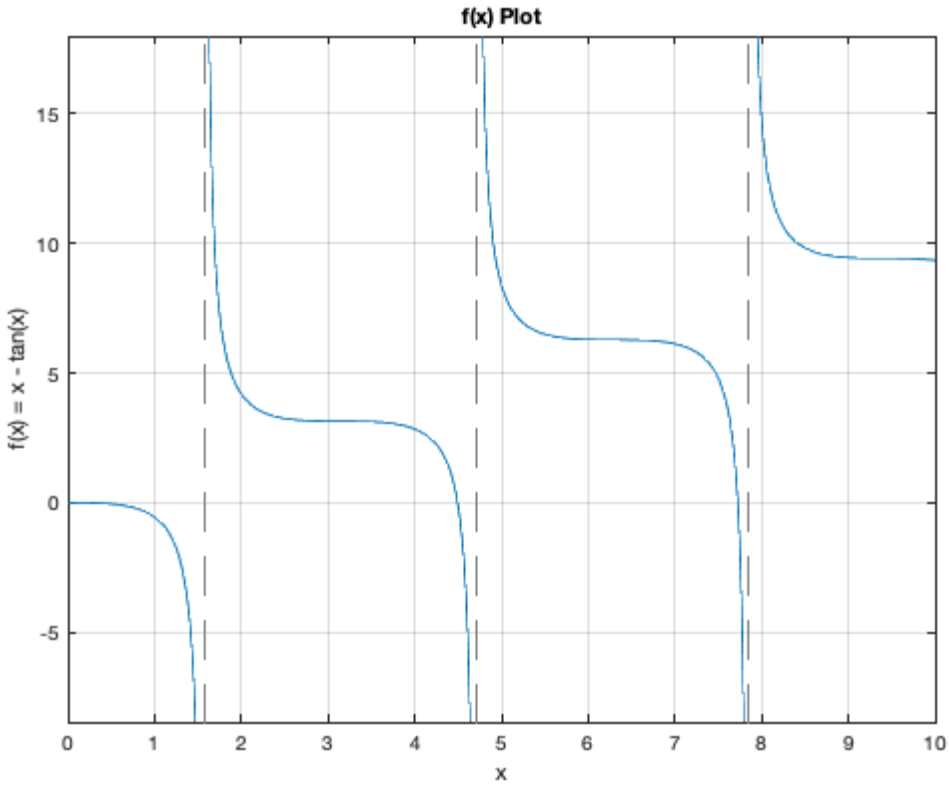
The two solutions that are nearest to 5 are the following:

x_1 =

    4.4934


x_2 =

    7.7253
```



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