BEE 4750/5750 Homework 0

Anne Potter (ap674)

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Problem 1

Problem 1.1

function square_number(x) output = x^2 return output end

Problem 1.2

"We can see that x^2 = Error: UndefVarError: square_number not defined."

Problem 1.3

using Plots data = rand(21, 2) for i in -10:10 data[i, 1] = i data[i, 2] = square_number(x[i]) end plot(data, label="square_number function", legend=:topright)

Problem 2

Problem 2.1

if x = a^2

then x/a = a

if a is too high, then the average of x/a and a will lower a

if a is too low, then the average of x/a and a will increase a

Problem 2.2

function newtonian_root(x, a) if (x/a - a) < 0.001 return a end a = (x/a + a) / 2 return newtonian_root(x, a) end

Problem 3

Problem 3.1

x = rand(20, 1)

Problem 3.2

function mean(vector) sum = 0 for i in 1:length(vector) sum += vector[i] end mean = sum / i return mean

function demean(vector) mean = mean(vector) new = rand(length(vector), 1) for i in 1:length(vector) new[i] = vector[i] - mean end return new

Problem 3.3

vect = ones(10, 1) for i in 1:10 if (i==1 || i==2 || i==9 || i==10) rand[i] = 0 end end

Problem 3.4

m = rand(5, 5) for i in 1:5 mean = mean(m[i,:]) for j in 1:5 m[i, j] -= mean end end

Problem 4

Problem 4.1

load the Pkg package manager

import Pkg # activate the project environment. The "." references the current working directory. This can be changed to any particular path. Pkg.activate(".") # instantiate the project environment. This installs any needed packages. Pkg.instantiate()

load Distributions.jl

using Distributions

log_dist = LogNormal(mu, sigma) samples = rand(log_dist, 100)

Problem 4.2

function phos_dynam(a, y_t, b, q, T, x_0) return x_t end

Problem 4.3

References