**MATLAB Quiz**

**Summer 2015**

**Version 2**

**Exercise 1:**

1. Let  be the function defined by the following series, for all x:



with:



and .

Express  as a function of  by finding such that:



Use the above relation in writing the MATLAB function **T(x,p),** to approximate f(x) up to a precision **p,** describedbelow.

function [t,N,y ] = T( x,p )

%T Summary of this function goes here

% Detailed explanation goes here

tol=0.5\*10^(1-p);

n=1;

t(1)=1/(factorial(3))\*(x/2)^3;

n=1;

while (t(n)>tol)

next=t(n)\*(-1)\*(x/2)^2/((n-1)\*(n+2));

t=[t next];

n=length(t);

end

N=n;

y=sum(t);

y=num2str(y,p);

end

Test the function **T(x,p)** using x=1 and p=3,7,10. The results should be expressed in double precision.

|  |  |
| --- | --- |
| P | T(x,p) |
| 3 |  |
| 7 |  |
| 10 |  |

**Exercise 2:**

Write a MATLAB function **function[U,L]=ColumnNaiveGauss(A)** that takes as input a square matrix A of size nxn verifying the pmp property. This function applies the column version of the Naïve Gauss reduction on A, and outputs the Upper triangular matrix U and the Unit Lower triangular matrix L.

function [ U,L ] = ColNaiveGauss(A)

%COLNAIVEGAUSS Summary of this function goes here

% Detailed explanation goes here

[n m]=size(A);

if (n==m)

for k=1:n-1 %number of reductions

%get the pivot

pivot=A(k,k);

%get the multipliers

for i=k+1:n

A(i,k)=A(i,k)/pivot; %we have the multipliers

end

%modify the body of matrix by column

for j=k+1:n

for i=k+1:n

A(i,j)=A(i,j)-A(i,k)\*A(k,j);

end

end

%the elements have been modified

end

%we are done with the reduction

%extract U

U=triu(A);

%extract L

L=tril(A,-1)+eye(n);

end

end

Test the function **ColumnNaiveGauss** on the matrix A=magic(5):

.

A=magic(5);

[U,L]=ColNaiveGauss(A)

%results

U =

17.0000 24.0000 1.0000 8.0000 15.0000

0 -27.4706 5.6471 3.1765 -4.2941

0 0 12.8373 18.1585 18.4154

0 0 0 -9.3786 -31.2802

0 0 0 0 90.1734

L =

1.0000 0 0 0 0

1.3529 1.0000 0 0 0

0.2353 -0.0128 1.0000 0 0

0.5882 0.0771 1.4003 1.0000 0

0.6471 -0.0899 1.9366 4.0578 1.0000

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