
```

%create vector
che=linspace(0,999,1000);
%Chebyshev nodes for x
chenode=(3/2) + (1/2)*cos(pi*(1-che/999));
chegamma=gamma(chenode);
%create Chebyshev nodes with n = 9
number=[9 17 19];
for i=1:length(number)
    node=linspace(0,number(i),number(i)+1);
    tau=(3/2) + (1/2)*cos(pi*(1-node/number(i)));
    name='Chebyshev nodes';
    l=1;
    figure((i-1)*4+1)
    rho=gamma(tau);
    p=secondbaryeval(tau,rho,chenode);
    plot(chenode,p,'r')
    xlabel('x')
    ylabel('y')
    title([name ' interpolant for n=',num2str(number(i))])
    hold on
    plot(tau,rho,'o')
    figure((i-1)*4+1+1)
    plot(chenode,abs(chegamma-p))
    xlabel('x');
    ylabel('y');
    title(['Error in ' name ];[' interpolant for n='
num2str(number(i))])
    %question 3
    V=vander(tau);
    rhoR=rho.';
    a = V\rhoR;
    y=polyval(a,chenode);
    figure((i-1)*4+1+2)
    plot(chenode,y)
    xlabel('x');
    ylabel('y');
    title([name ' interpolant expressed in '];['the monomial
basis for n=' num2str(number(i))])
    hold on
    plot(tau,rho,'o')
    %question 4
    figure((i-1)*4+1+3)
    plot(chenode,abs(chegamma-y))
    xlabel('x');
    ylabel('y');
    title(['Error in ' name ' interpolant '];[' expressed in
the monomial basis for n=' num2str(number(i))])
    if i==3
        %gamma 5/2
        disp('rho(5/2) by secondbaryeval interpolant
directly')
        secondbaryeval(tau,rho,5/2)

```

```

                                disp('rho(5/2) by gamma(1+z)=z*gamma(z) where z is
in [1,2]')
                                3/2*secondbaryeval(tau,rho,3/2)
                                disp('gamma(5/2)') ;
                                gamma(5/2)
                                disp('error for rho(5/2) by secondbaryeval
interpolant directly')
                                abs(gamma(5/2)-secondbaryeval(tau,rho,5/2))
                                disp('error for rho(5/2) by gamma(1+z)=z*gamma(z)
where z is in [1,2]')
                                abs(gamma(5/2)-
3/2*secondbaryeval(tau,rho,3/2))
                                %gamma 7/2
                                disp('rho(7/2) by secondbaryeval interpolant
directly')
                                secondbaryeval(tau,rho,7/2)
                                disp('rho(7/2) by gamma(1+z)=z*gamma(z) where z is
in [1,2]')
                                (5/2)*(3/2)*secondbaryeval(tau,rho,3/2)
                                disp('gamma(7/2)') ;
                                gamma(7/2)
                                disp('error for rho(7/2) by secondbaryeval
interpolant directly')
                                abs(gamma(7/2)-secondbaryeval(tau,rho,7/2))
                                disp('error for rho(7/2) by gamma(1+z)=z*gamma(z)
where z is in [1,2]')
                                abs(gamma(7/2)-
(5/2)*(3/2)*secondbaryeval(tau,rho,3/2))
                                %gamma 9/2
                                disp('rho(9/2) by secondbaryeval interpolant
directly')
                                secondbaryeval(tau,rho,9/2)
                                disp('rho(9/2) by gamma(1+z)=z*gamma(z) where z is
in [1,2]')
                                7/2*5/2*3/2*secondbaryeval(tau,rho,3/2)
                                disp('gamma(9/2)') ;
                                gamma(9/2)
                                disp('error for rho(9/2) by secondbaryeval
interpolant directly')
                                abs(gamma(9/2)-secondbaryeval(tau,rho,9/2))
                                disp('error for rho(9/2) by gamma(1+z)=z*gamma(z)
where z is in [1,2]')
                                abs(gamma(9/2)-
(7/2)*(5/2)*(3/2)*secondbaryeval(tau,rho,3/2))
                                end
                                end

```

Warning: Matrix is close to singular or badly scaled. Results may be inaccurate.

RCOND = 1.570864e-21.

Warning: Matrix is close to singular or badly scaled. Results may be inaccurate.

RCOND = 3.056995e-23.

rho(5/2) by secondbaryeval interpolant directly

```

ans =

    1.3293

rho(5/2) by gamma(1+z)=z*gamma(z) where z is in [1,2]

ans =

    1.3293

gamma(5/2)

ans =

    1.3293

error for rho(5/2) by secondbaryeval interpolant directly

ans =

    5.4581e-05

error for rho(5/2) by gamma(1+z)=z*gamma(z) where z is in [1,2]

ans =

    2.2204e-15

rho(7/2) by secondbaryeval interpolant directly

ans =

   -12.0667

rho(7/2) by gamma(1+z)=z*gamma(z) where z is in [1,2]

ans =

    3.3234

gamma(7/2)

ans =

    3.3234

error for rho(7/2) by secondbaryeval interpolant directly

ans =

    15.3900

error for rho(7/2) by gamma(1+z)=z*gamma(z) where z is in [1,2]

```

ans =

5.3291e-15

rho(9/2) by secondbaryeval interpolant directly

ans =

-31.2105

*rho(9/2) by gamma(1+z)=z*gamma(z) where z is in [1,2]*

ans =

11.6317

gamma(9/2)

ans =

11.6317

error for rho(9/2) by secondbaryeval interpolant directly

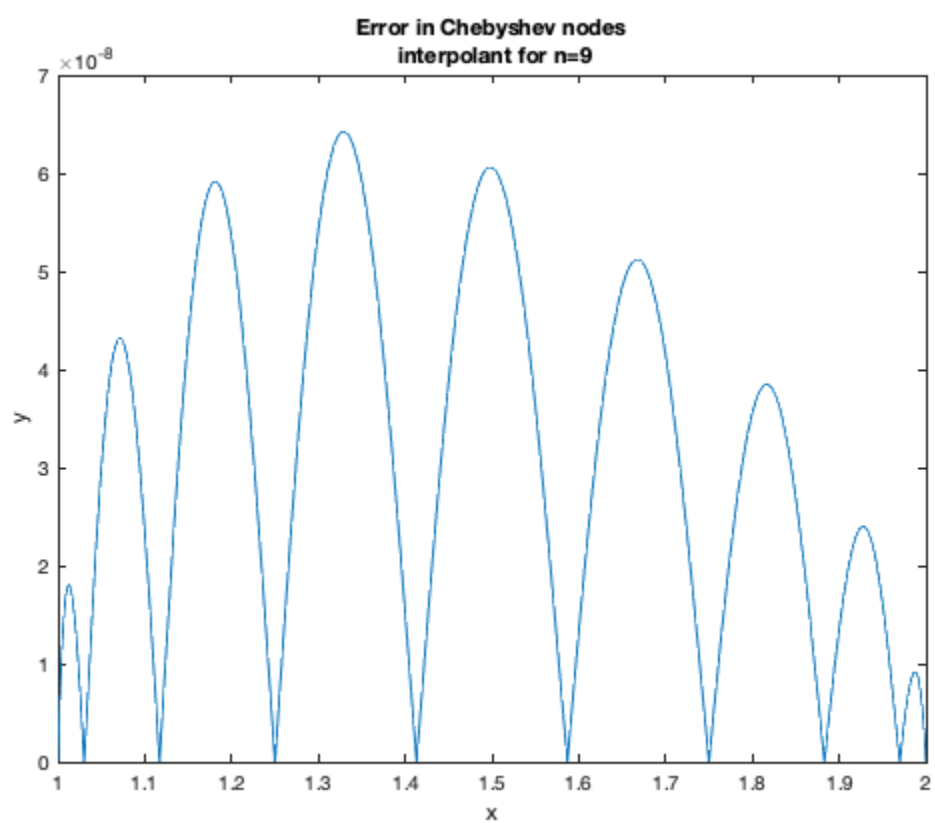
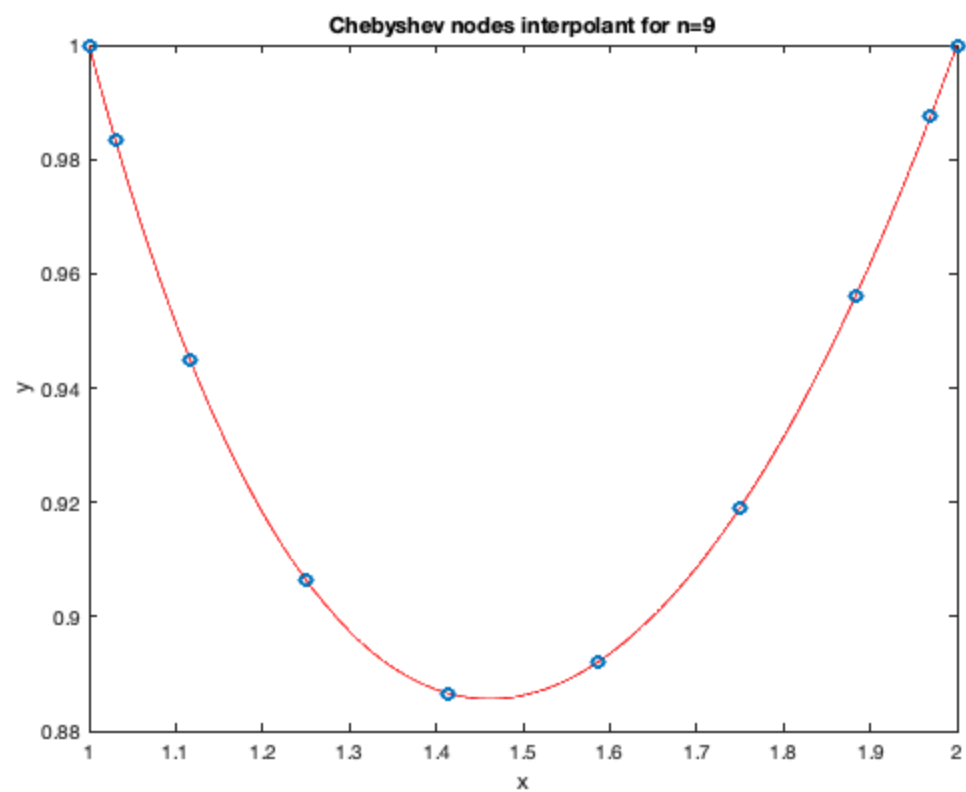
ans =

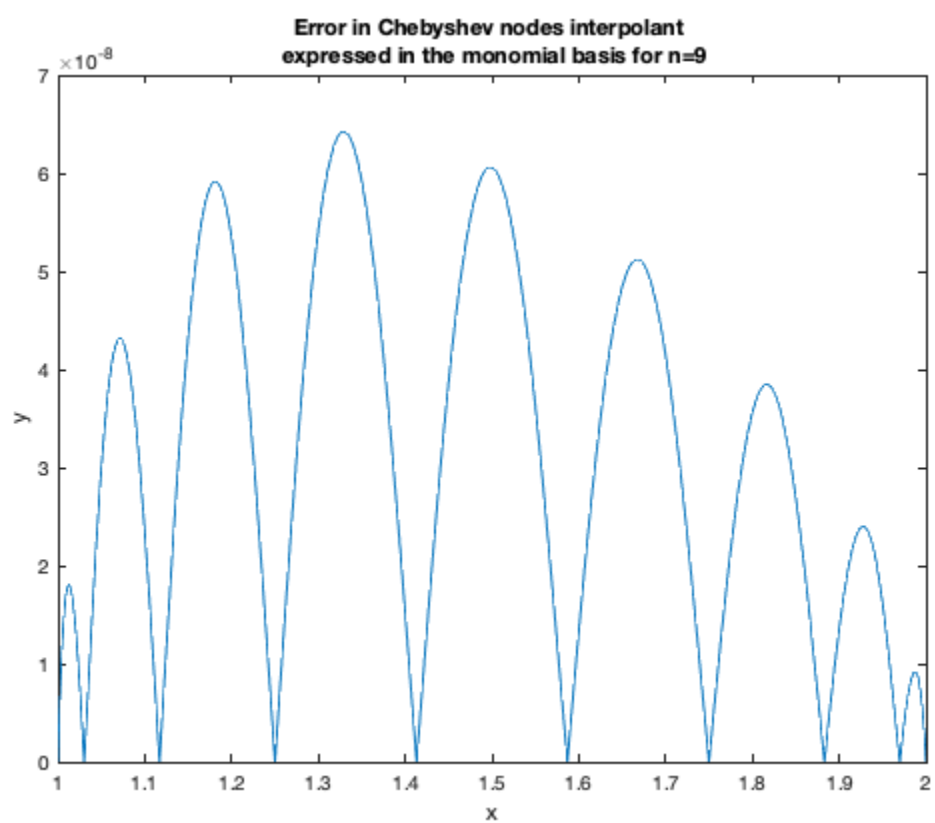
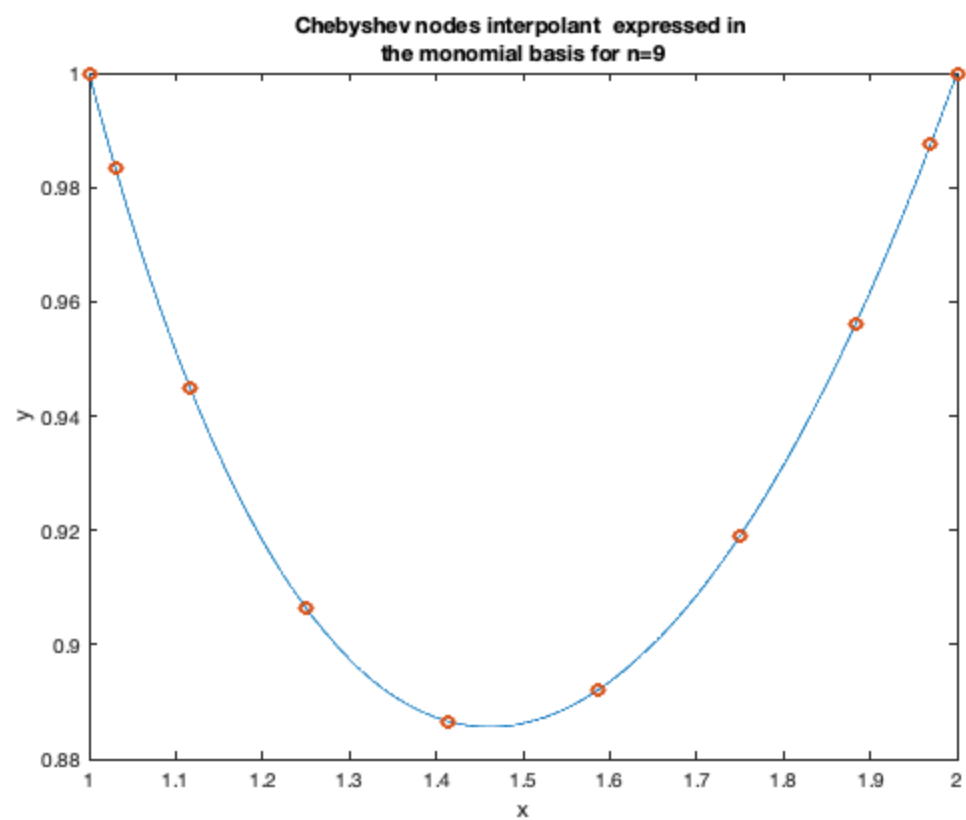
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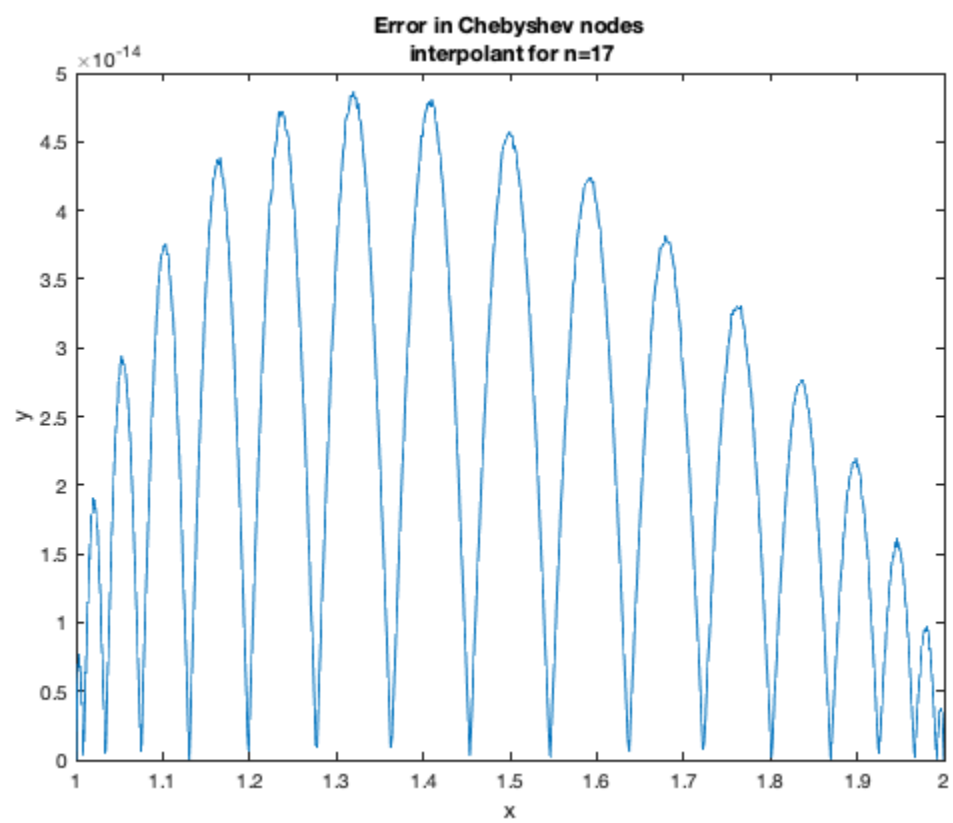
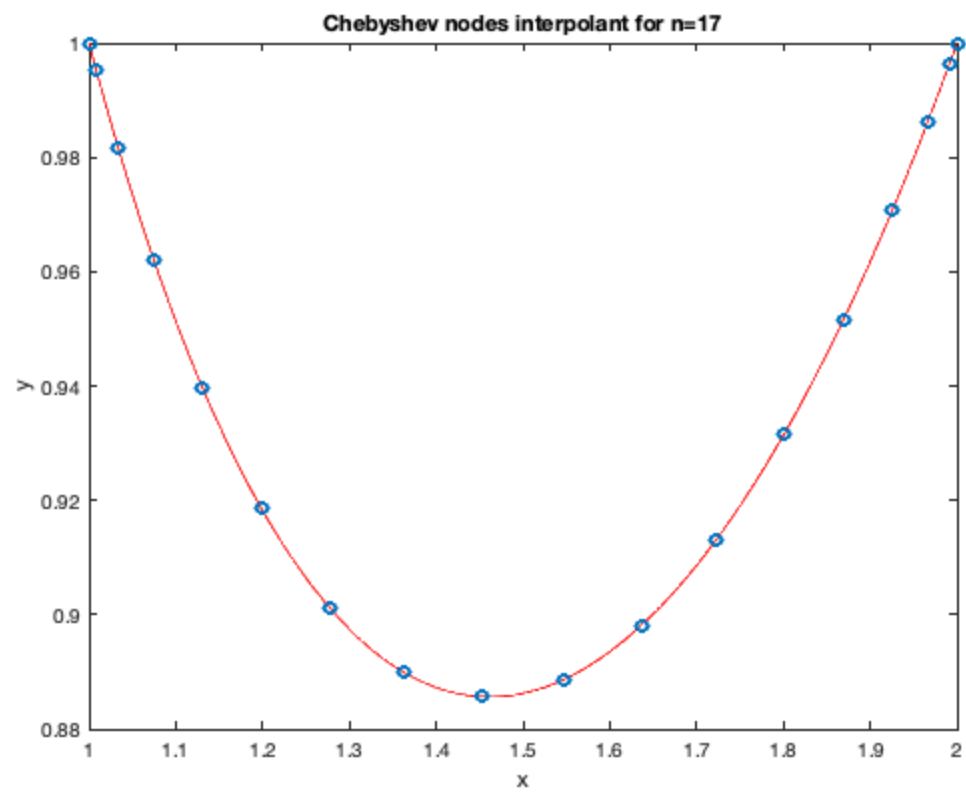
*error for rho(9/2) by gamma(1+z)=z*gamma(z) where z is in [1,2]*

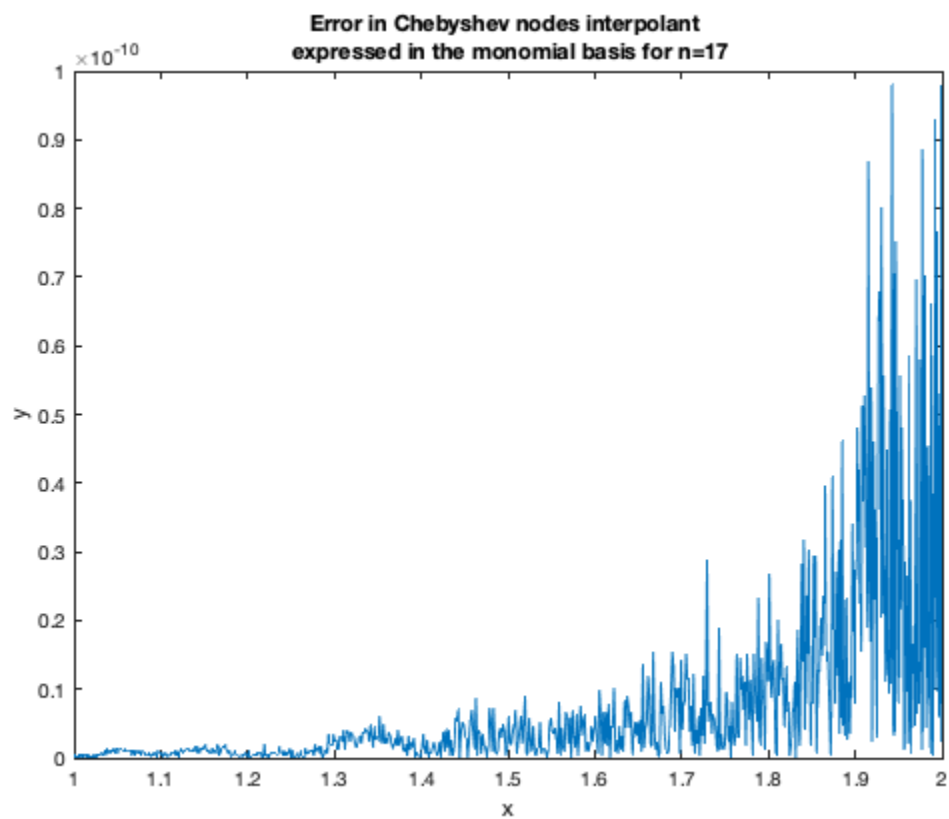
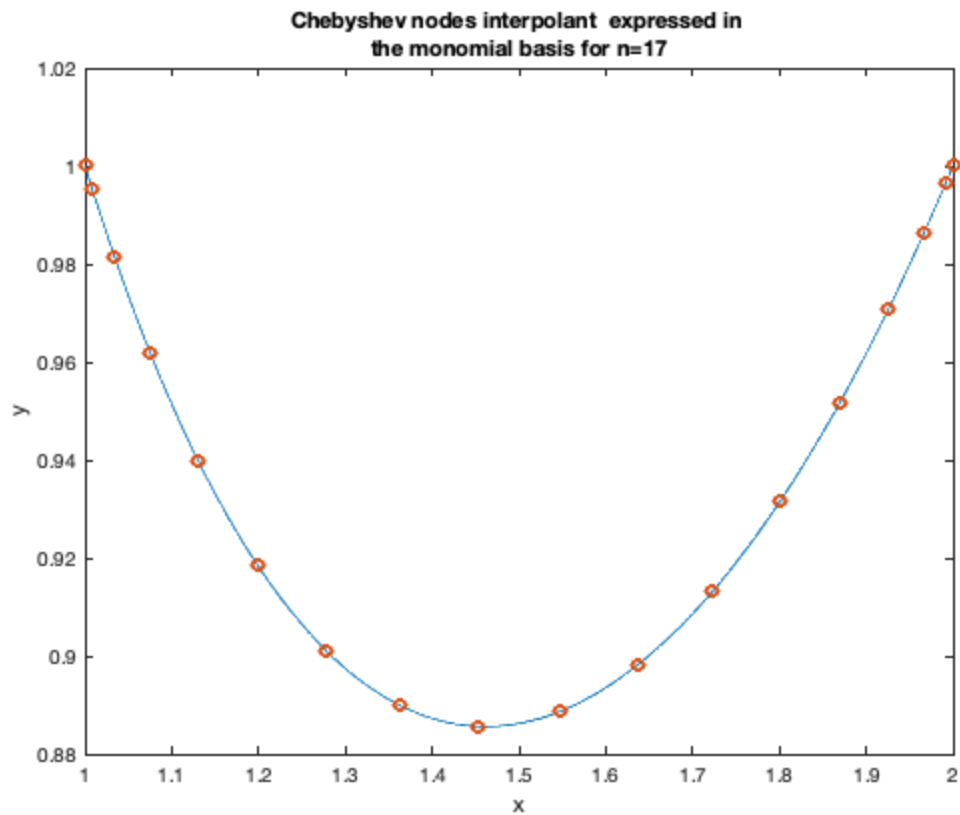
ans =

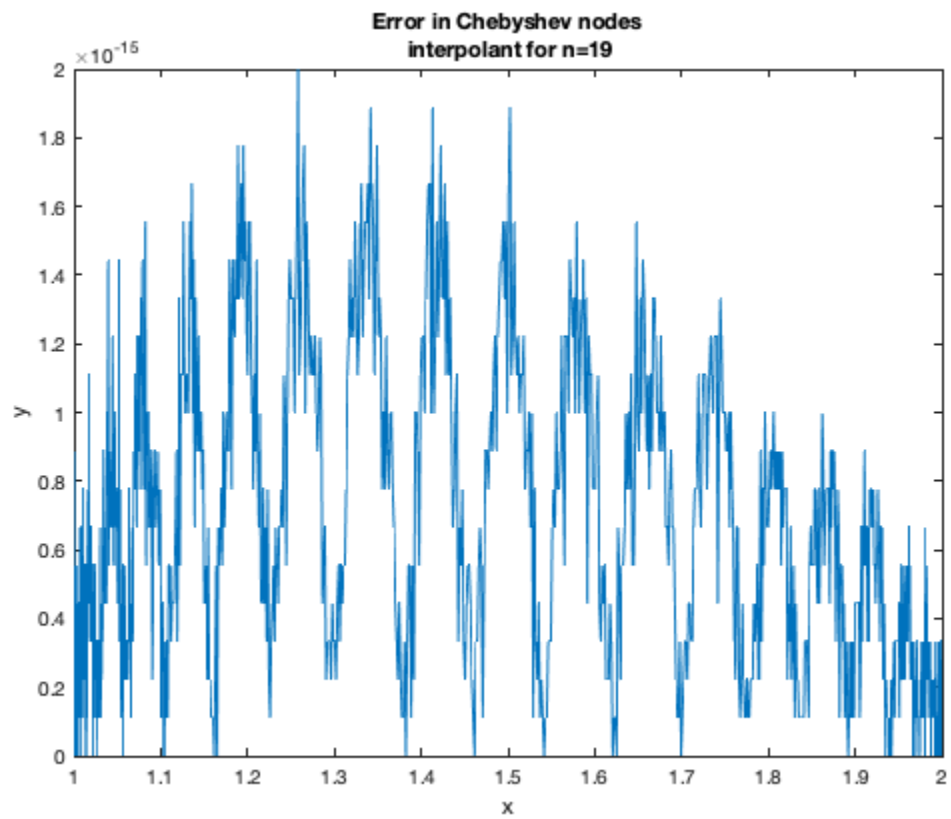
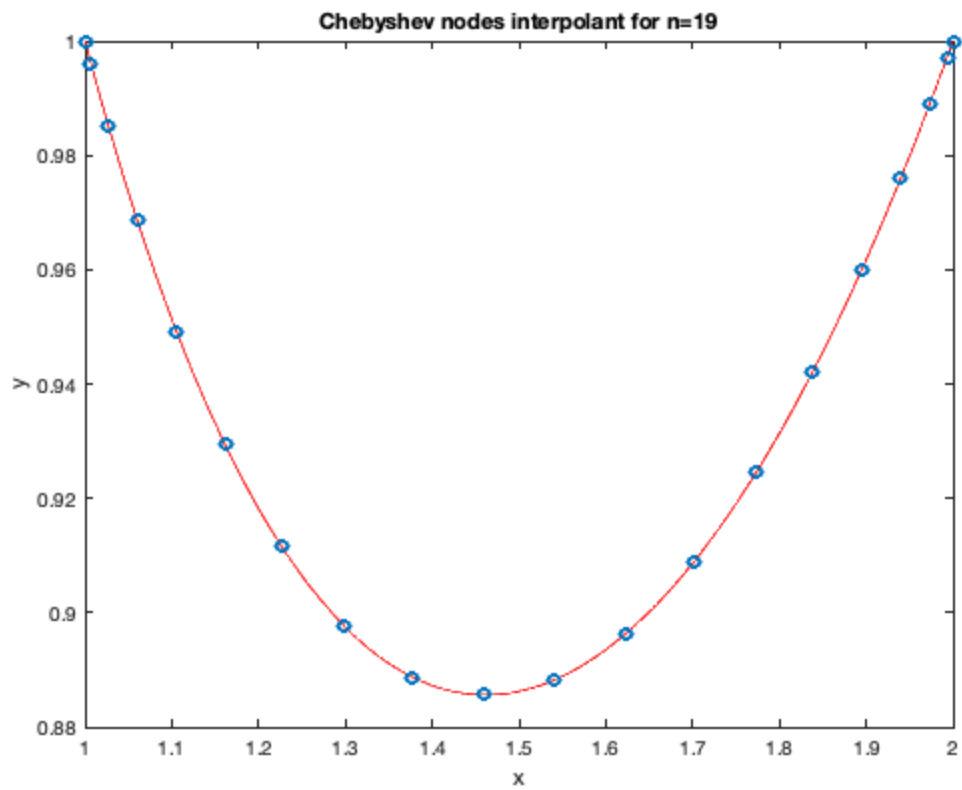
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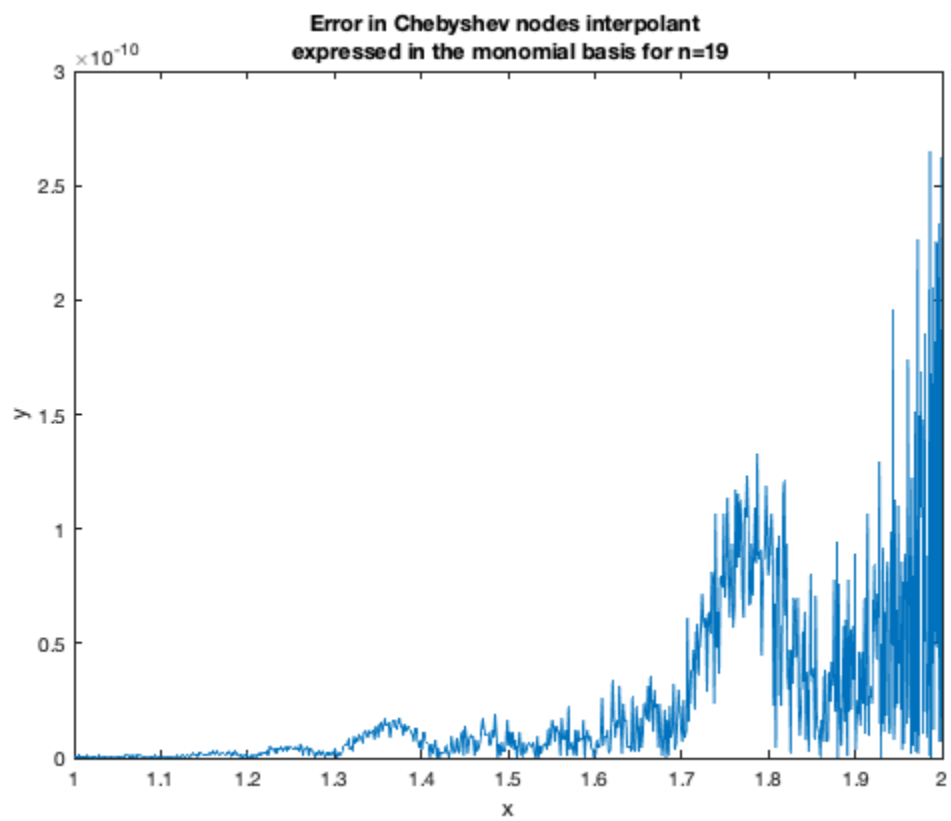
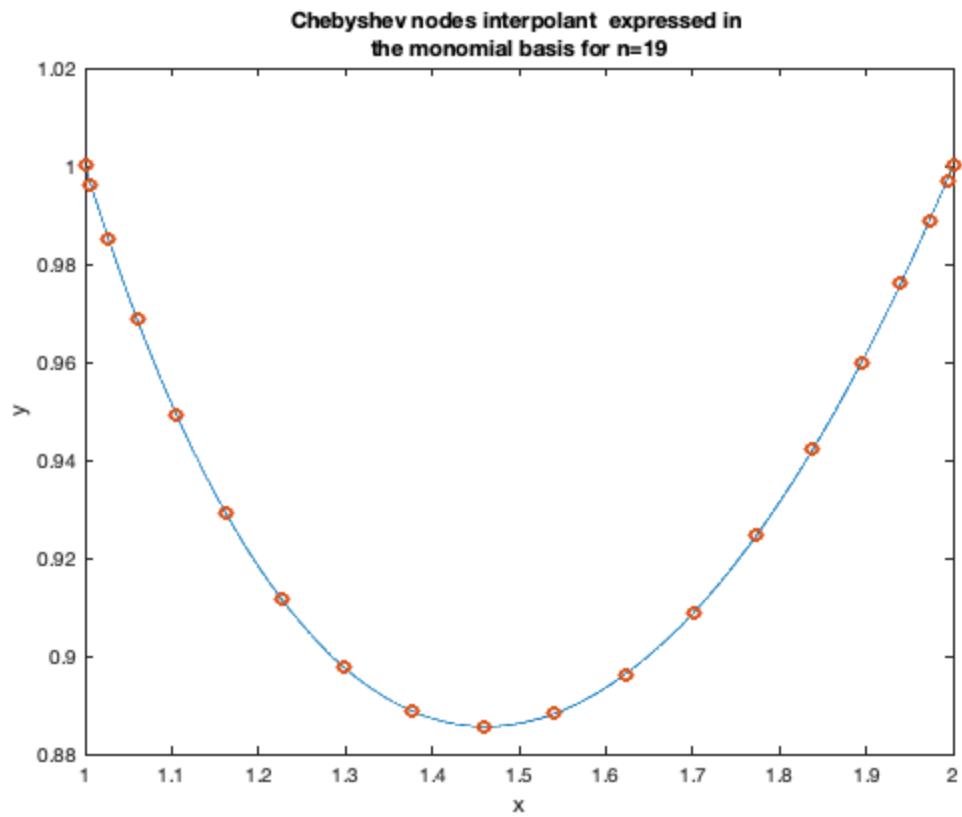












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