

Introduction to Week Four

Elementary Integration Formulas

Composite Integration Formulas

Quadrature in MATLAB

Interpolation

Interpolation in MATLAB

Quiz

Programming Assignment: Bessel Function Zeros

Video: Bessel Functions and their Zeros | Lecture 47

6 min

Ungraded External Tool: Bessel Function Zeros (audit)

1h

Reading: Reference Solution to "Bessel Function Zeros (audit)"

1 min

Graded External Tool: Bessel Function Zeros Submitted

Reading: Reference Solution to "Bessel Function Zeros"

1 min

# Reference Solution to "Bessel Function Zeros"

```
num_roots=5; num_functions=6;
%initial guess for roots (from Wolfram MathWorld)
bzeros_guess=[2.4,3.8,5.1,6,7.5,8.7;...
5.5,7,8.4,9.7,11,12;...
8.6 10,11.6,13,14,16;...
11.8,13,15,16,18,19;...
15,16.4,18,19.4,21,22];
integrand = @(theta,x,n) cos(x.*sin(theta)-n*theta);
J_n = @(x) integral(@(theta)integrand(theta,x,n),0,pi);
for n=0:num_functions-1
    J_n = @(x) integral(@(theta)integrand(theta,x,n),0,pi);
    for k=1:num_roots
        bzeros(k,n+1)=fzero(J_n,bzeros_guess(k,n+1));
    end
end
%print table
fprintf('k  J0(x)  J1(x)  J2(x)  J3(x)  J4(x)  J5(x)\n')
for k=1:num_roots
    fprintf('%i',k)
    for n=0:num_functions-1
        fprintf('%10.4f',bzeros(k,n+1));
    end
    fprintf('\n');
end
```

✓ Completed

Go to next item

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