

```

n = [5 10 20 40];
f1 = @(x) cos(x);
f2 = @(x) (1./(1+x.^2));
for j = 1:length(n)
x = linspace(-1, 1, n(j));
p = polyfit(x, f1(x), n(j));
Err = (polyval(p, x))-f1(x);
disp('Natural Error f1');
disp(Err);

p = polyfit(x, f2(x), n(j));
Err = (polyval(p, x))-f2(x);
disp('Natural Error f2');
disp(Err);

Y = f2(x);
if size(x,1) > 1; x = x'; end
if size(Y,1) > 1; Y = Y'; end
if size(x,1) > 1 || size(Y,1) > 1 || size(x,2) ~= size(Y,2)
error('both inputs must be equal-length vectors')
end
N = length(x);
pvals = zeros(N,N);
for j = 1:N
pp = poly(x( (1:N) ~= j));
pvals(j,:) = pp ./ polyval(pp, x(j));
end
P = Y*pvals;
Err = P - f2(x);
disp('Lagrange Interpolation Error f2:');
disp(Err);
Y = f1(x);
if size(x,1) > 1; x = x'; end
if size(Y,1) > 1; Y = Y'; end
if size(x,1) > 1 || size(Y,1) > 1 || size(x,2) ~= size(Y,2)
error('both inputs must be equal-length vectors')
end
N = length(x);
pvals = zeros(N,N);
for j = 1:N
pp = poly(x( (1:N) ~= j));
pvals(j,:) = pp ./ polyval(pp, x(j));
end
P = Y*pvals;
Err = P - f1(x);
end

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