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% Derive Shape functions for quadratic beam element
% For all points, the polynomials N and N' are evaluated.
% w=a+bx+cx^2+dx^3
b=[1 -1 1 -1; % w(-1) x^n
    1 1 1 1; % w(1) x^n
    0 1 -2 3; % w'(-1) x^n
    0 1 2 3] % w'(1) x^n
b=fliplr(b);
disp('b flipped to decreasing power order')
% For N1
a=[1 0 0 0]';
c1=(b\a)';
c1d=polyderiv(c1)
c1dd=polyderiv(polyderiv(c1))
% For N2
a=[0 0 1 0]';
c2=(b\a)';
c2d=polyderiv(c2)
c2dd=polyderiv(polyderiv(c2))
% For N6
a=[0 1 0 0]';
c3=(b\a)';
c3d=polyderiv(c3)
c3dd=polyderiv(polyderiv(c3))
% For N5
a=[0 0 0 1]';
c4=(b\a)';
c4d=polyderiv(c4)
c4dd=polyderiv(polyderiv(c4))
i=-1:.01:1;
plot(i,polyval(c1,i),i,polyval(c2,i),i,polyval(c3,i),...
    i,polyval(c4,i))

%plot(i,polyval(c1,i),"-;sf1;",i,polyval(c2,i),"-
;sf2;",i,polyval(c3,i),"-;sf3;",i,polyval(c4,i),"-
;sf4;",i,polyval(c5,i),"-;sf5;",i,polyval(c6,i),"-;sf6;")

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