ME 535 Assignment 3, Fall 2018

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Question 4.3:

c. Read the IGES file into Matlab

Name of igs file: Fish.igs

```matlab
% read the igs file to matlab
clear;clf;
file_name = input('Pleas input the file name: ','s');
fp = fopen(file_name, 'r');
s = fscanf(fp,'%c',[82 inf]);s=s';
fclose(fp);

n=size(s);
j=0;
for i=1:n(1)-1
    temp = s(i,:);
    t = str2double(temp(6:8));
    % If t=126 indicate this line recorded a BS_curve
    if t == 126
        j = j+1;
        % find the bs_curve parameter segment number
        l = temp(13:16);
        % the following find BS_curve parameter segment
        for ii = i:n(1)-1
            temp1 = s(ii,:);
            % find BSCURVE parameter segment
            if strcmp(temp1(77:80),l) & str2double(temp1(1:3)) == t
                % parameter segment sign, in our example is '21P'
                temp2 = temp1(70:73);
                row1 = ii;
                for i2 = ii:n(1)-1
                    temp3 = s(i2,:);
                    % find all parameter lines in the same BSCURVE
                    if strcmp(temp3(70:73),temp2)
                        % record the last BS_curve parameter line
                        k = i2;
                    end
                end
                for i3=1:k-row1+1
                    bs(i3,:)=s(row1+i3-1,:);
                end
                %call bspline processing function
                hold on;
                bsp_curve(bs);
                clear bs
            end
        end
    elseif t==128 %  BS_surface
        j=j+1;
        l = temp(13:16);%bs_surface eparameter segment
        %  find bs_surface parameter
        for ii=i:n(1)-1
            temp1=s(ii,:);
            if strcmp(temp1(77:80),l) & str2double(temp1(1:3)) == t% find BSCURVE parameter segment
                % parameter segment example: 25p
                temp2 = temp1(70:73);
                row1=ii;
                for i2=ii:n(1)-1
                    temp3=s(i2,:);
                    % find all parameter lines in the same BSCURVE
```

```matlab
                    if strcmp(temp3(70:73),temp2)
                        k=i2; %record the last BS_cruve parameter line
                    end
                end
                for i3=1:k-row1+1
                    bs(i3,:)=s(row1+i3-1,:);
                end
                %call bs drawing function
                hold on;
                bsp_surface(bs);
                view(-8,-42);
                clear bs
            end
        end
    end

end
```

```
 degree 3
 weights
   Columns 1 through 23

     1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1

   Columns 24 through 42

     1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1

 control points...
     0.0600    9.0265         0
     2.7841    7.1406         0
     3.0355    4.7518         0
     3.2451    2.1115         0
     3.2870    1.1057         0
     3.4127    0.3094         0
     3.9575    0.0580         0
     4.4604   -0.6545         0
     4.9214   -1.5346         0
     5.3405   -2.6661         0
     5.4662   -3.7138         0
     5.4662   -4.5520         0
     5.5919   -5.1387         0
     5.0890   -4.8873         0
     4.8795   -4.6358         0
     4.6700   -4.1748         0
     4.3347   -3.3785         0
     4.2090   -3.0433         0
     4.1670   -3.0433         0
     3.9994   -3.1690         0
     4.1251   -3.7557         0
     4.2928   -4.2586         0
     3.4546   -3.6719         0
     3.1193   -2.6661         0
     2.8679   -2.5404         0
     3.0355   -3.8395         0
     3.1193   -6.0607         0
     2.4488   -7.5275         0
     1.7782   -8.2819         0
     1.0671   -9.2445         0
     1.0671   -9.4482         0
     1.3726  -11.1455         0
     2.5267  -12.6730         0
     3.5112  -13.6235         0
     4.1561  -14.1667         0
     4.7332  -14.6759         0
     4.9709  -14.9474         0
     3.3075  -14.3364         0
     2.3570  -13.8612         0
     1.4065  -13.3520         0
```

```
        0.7276   -12.9107           0
        0.0147   -12.5033           0

   knotvector
     Columns 1 through 14

          0          0          0          0    1.0971    2.1942    3.2913    4.3884    5.4855    6.5826    7.6797    8.

     Columns 15 through 28

     12.0680    13.1651    14.2622    15.3593    16.4564    17.5535    18.6506    19.7477    20.8448    21.9419    23.0390    24.

     Columns 29 through 42

     27.4274    28.5245    29.6216    30.7187    31.8157    32.9128    34.0099    35.1070    36.2041    37.3012    38.3983    39.

     Columns 43 through 46

     42.7867    42.7867    42.7867    42.7867

   degree 3
   weights
     Columns 1 through 23

       1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1

     Columns 24 through 42

       1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1

   control points...
       -0.0600     9.0265           0
       -2.7841     7.1406           0
       -3.0355     4.7518           0
       -3.2451     2.1115           0
       -3.2870     1.1057           0
       -3.4127     0.3094           0
       -3.9575     0.0580           0
       -4.4604    -0.6545           0
       -4.9214    -1.5346           0
       -5.3405    -2.6661           0
       -5.4662    -3.7138           0
       -5.4662    -4.5520           0
       -5.5919    -5.1387           0
       -5.0890    -4.8873           0
       -4.8795    -4.6358           0
       -4.6700    -4.1748           0
       -4.3347    -3.3785           0
       -4.2090    -3.0433           0
       -4.1670    -3.0433           0
       -3.9994    -3.1690           0
       -4.1251    -3.7557           0
       -4.2928    -4.2586           0
       -3.4546    -3.6719           0
       -3.1193    -2.6661           0
       -2.8679    -2.5404           0
       -3.0355    -3.8395           0
       -3.1193    -6.0607           0
       -2.4488    -7.5275           0
       -1.7782    -8.2819           0
       -1.0671    -9.2445           0
       -1.0671    -9.4482           0
       -1.3726   -11.1455           0
       -2.5267   -12.6730           0
       -3.5112   -13.6235           0
       -4.1561   -14.1667           0
       -4.7332   -14.6759           0
       -4.9709   -14.9474           0
       -3.3075   -14.3364           0
       -2.3570   -13.8612           0
```

```
     -1.4065   -13.3520          0
     -0.7276   -12.9107          0
     -0.0147   -12.5033          0

  knotvector
    Columns 1 through 14

         0         0         0         0    1.0971    2.1942    3.2913    4.3884    5.4855    6.5826    7.6797    8.

    Columns 15 through 28

    12.0680   13.1651   14.2622   15.3593   16.4564   17.5535   18.6506   19.7477   20.8448   21.9419   23.0390   24.

    Columns 29 through 42

    27.4274   28.5245   29.6216   30.7187   31.8157   32.9128   34.0099   35.1070   36.2041   37.3012   38.3983   39.

    Columns 43 through 46

    42.7867   42.7867   42.7867   42.7867
```
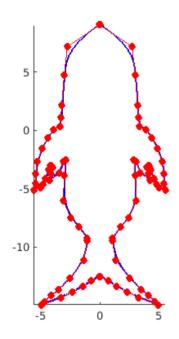

d. Demonstrate the geometric effect of changing control points: