CMPE 362 HW2: SPLINE INTERPOLATION APPLICATION

Yekta Said CAN

1.Quadratic Spline Constraints

- 1. Functional values are equal at the interior knots.
- 2. The first and last functions must pass the endpoints.
- 3. First derivatives are equal at the interior knots.
- 4. Second derivative of f0 is zero.

2. Data

- You will use the stress for a microstrain data.

TABLE 2.3 Stress, y_i (psi), versus Microstrain, x_i

i	y_i	x_i	w_i
1	1025	265	3.86
2	1400	400	3.50
3	1710	500	3.42
4	2080	700	2.97
5	2425	950	2.55
6	2760	1360	2.03
7	3005	2080	1.44
8	2850	2450	1.16
9	2675	2940	0.91

3. Implementation

- We needed Ax=b type matrix multiplication for MATLAB. We 3N-3 equations and 3N-3 unknowns.
- So, create A and b by using constaints.

3. Implementation(cont'd)

- Use linsolve method of MATLAB to find a solution to this equation. It uses LU factorization.
- Res = linsolve(A,B);

1	2080	4326400	0	0	0	0	0	0
0	0	0	1	2080	4326400	0	0	0
0	0	0	1	2450	6002500	0	0	0
0	0	0	0	0	0	1	2450	6002500
0	1	4160	0	-1	-4160	0	0	0
0	0	0	0	1	4900	0	-1	-4900
1	1360	1849600	0	0	0	0	0	0
0	0	0	0	0	0	1	2940	8643600
0	0	1	0	0	0	0	0	0

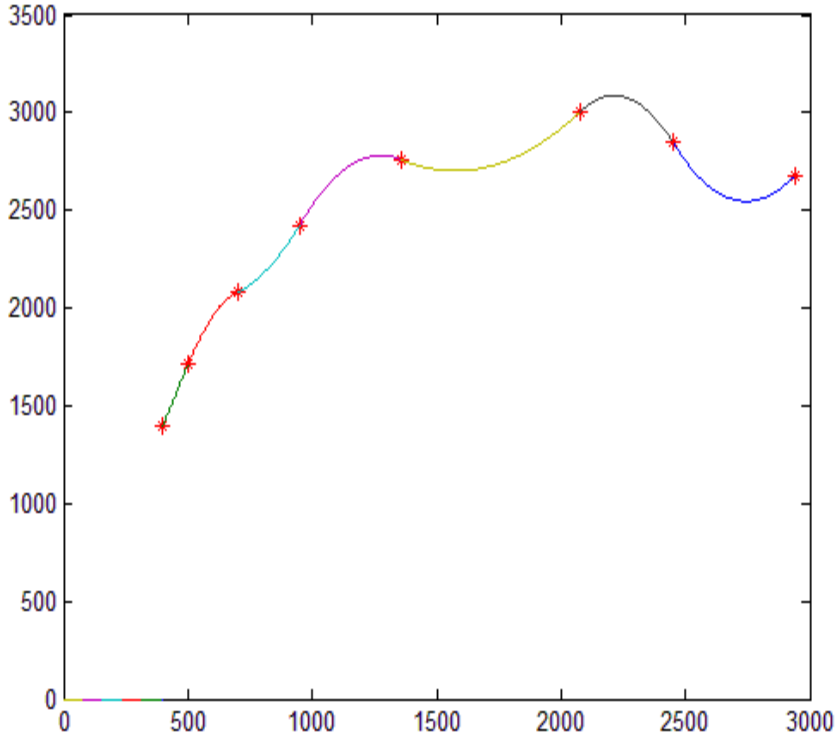
3005
3005
2850
2850
0
0
2760
2675
0

3. Implementation(cont'd)

- The result is:
- A0=?
- B0=?
- C0=?
- A1=?
- B1=?
- C1=?

- A2=?
- B2=?
- C2=?

4. Plots



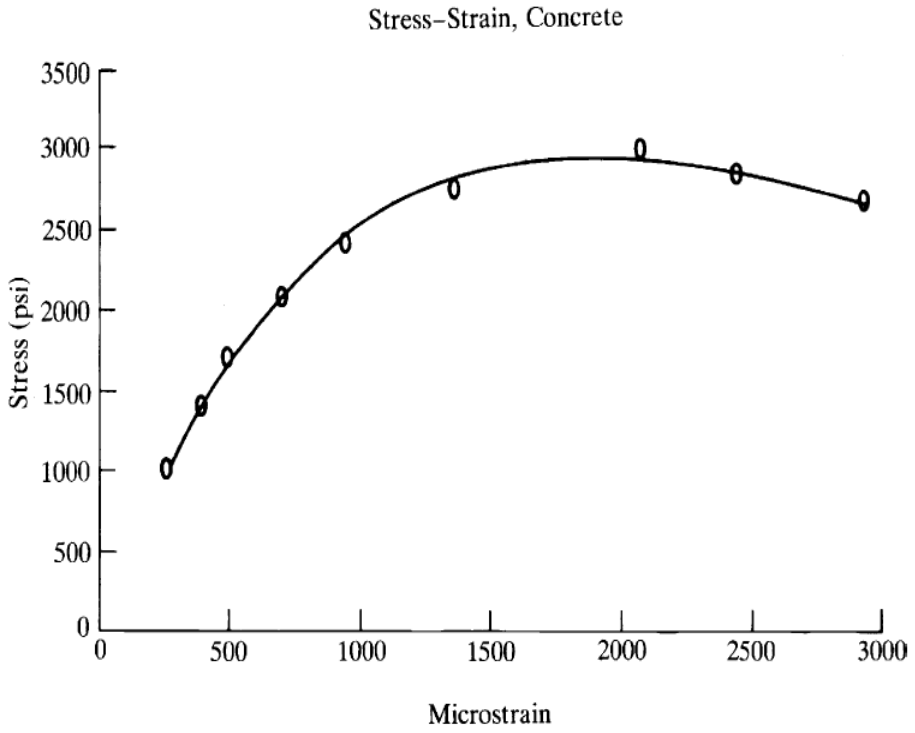


FIGURE 2.8 Stress-strain characteristic for a concrete block.