EXAMPLE 17.1

```
>> format long
>> A = [90000 300 1;160000 400 1;250000 500 1];
>> b = [0.616 0.525 0.457]';
>> p=A\b
p =

   1.150000000000002e-06
  -1.715000000000002e-03
   1.027000000000000e+00
```

EXAMPLE 17.2

예제 17.2

$$f_1(2) = 0 + \frac{1.791759 - 0}{6 - 1}(2 - 1) = 0.3583519 \quad \Rightarrow \varepsilon_t = 48.3\%$$

$x_1 = 1$, $x_2 = 4$ 사이에서 계산하면

$$f_1(2) = 0 + \frac{1.386294}{4 - 1}(2 - 1) = 0.4620981$$

∴ 간격을 작게하면 ε_t를 33.3%로 감소시킴

EXAMPLE 17.3

예제 17.3

$b_1 = f(x_1)$을 적용하면

$b_1 = 0$

$b_2 = \frac{f(x_2) - f(x_1)}{x_2 - x_1}$ 으로 계산하면

$$b_2 = \frac{1.386294 - 0}{4 - 1} = 0.4620981$$

$$b_3 = \frac{\frac{1.791759 - 1.386294}{6 - 4} - 0.4620981}{6 - 1} = -0.0518731$$

$$f_2(x) = 0 + 0.4620981(x - 1) - 0.0518731(x - 1)(x - 4)$$

이 식을 $x = 2$ 에서 계산하면 $f_2(2) = 0.5658444$, $\varepsilon_t = 18.4\%$ 가 된다

EXAMPLE 17.4

예제 17.4

$$f[x_2, x_1] = \frac{1.386294 - 0}{4 - 1} = 0.4620981$$

$f[x_3, x_2] = 0.2027326$

$f[x_4, x_3] = 0.1823216$

2차 계비분

$$f[x_3, x_2, x_1] = \frac{0.2027326 - 0.4620981}{6 - 1} = -0.05187311$$

$f[x_4, x_3, x_2] = -0.02041100$

3차 계비분

$f[x_4, x_3, x_2, x_1] = 0.00786552\,9$

$$f_2(x) = 0 + 0.4620981(x-1) - 0.05187311(x-1)(x-4) + 0.00786552\,9(x-1)(x-4)(x-6)$$

$f_3(2) \Rightarrow 0.6287686$

EXAMPLE 17.5

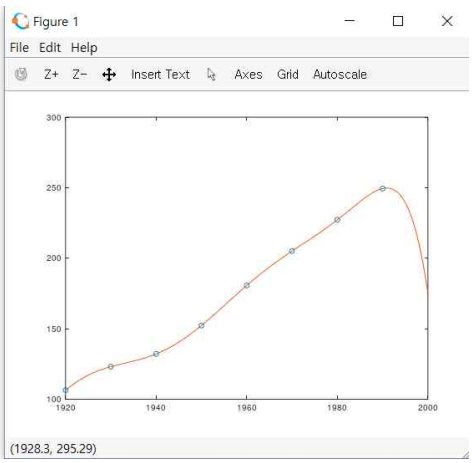
예제 17.5

$$f_1(x) = \frac{15-20}{0-20}3.85 + \frac{15-0}{20-0}0.800 = 1.5625$$

$$f_2(x) = \frac{(15-20)(15-40)}{(0-20)(0-40)}3.85 + \frac{(15-0)(15-40)}{(20-0)(20-40)}0.800 + \frac{(15-0)(15-20)}{(40-0)(40-20)}0.212 = 1.3316875$$

EXAMPLE 17.6

```
>> t = [1920:10:1990];
>> pop = [106.46 123.08 132.12 152.27 180.67 205.05 227.23 249.46];
>> p = polyfit(t,pop,7)
warning: matrix singular to machine precision, rcond = 3.00796e-38
warning: called from
    polyfit at line 120 column 5
p =

 Columns 1 through 4:

  -8.090182447179175e-10   1.105420718470715e-05  -6.472941615810718e-02

 Columns 5 through 8:

  -4.109611069202232e+05   4.812262869848154e+08  -3.130450866292230e+11

>> ts = (t - 1955)/35;
>> p = polyfit(ts,pop,7);
>> polyval(p,(2000-1955)/35)
ans =  175.0800000000003
>> tt = linspace(1920,2000);
>> pp = polyval(p,(tt-1955)/35);
>> plot(t,pop,'o',tt,pp)
>>
```



연습문제 17.3

연습문제 17.3

$f_0(8) = 9.9$,

$f_1(8) = 9.9 + 0.034545(8-5.5) = 10.036364$

$f_2(x) = 10.5159091$

$f_3(x) = 10.00511$

$f_4(x) = 10.81227$

연습문제 17.5

연습문제 17.5

x	f(x)	1	2	3	4
3					0
5					
2					
6					
1					

4번째로 나눠진 차이가 0 이므로 데이터가 3차 다항식

① $f_0(4) = 5.5$

② $f_1(4) = 5.5 + 17.25(4-3) = 22.75$

③ $f_2(4) = 22.75 + 5.25(4-3)(4-5) = 17.5$

④ $f_3(4) = 17.5 + 0.05(4-3)(4-5)(4-2) = 16$

⑤ $f_4(4) = 16 + 0(4-3)(4-5)(4-2)(4-6) = 16$

연습문제 17.6

연습문제 17.6

① $f_1(4) = \frac{4-5}{3-5}5.5 + \frac{4-3}{5-3}40 = 17.25$

② $f_2(4) = \frac{(4-5)(4-2)}{(3-5)(3-2)}5.5 + \frac{(4-3)(4-2)}{(5-3)(5-2)}40 +$

$\frac{(4-3)(4-5)}{(2-3)(2-5)}4 = 17.5$

③ $f_3(4) = \frac{(4-5)(4-2)(4-6)}{(3-5)(3-2)(3-6)}5.5 + \frac{(4-3)(4-2)}{(5-3)(5-2)}40 +$

$+ \frac{(4-3)(4-5)(4-6)}{(2-3)(2-5)(2-6)}4 + \frac{(4-3)(4-5)(4-2)}{(6-3)(6-5)(6-2)}52 = 16$