수치해석 HW#5

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8.3

```
>> A = [0 7 -5; 0 4 7; -4 3 -7];
>> b = [-50 -30 40]';
>> A = inv(A);
>> x = A*b

x =

  -15.1812
   -7.2464
   -0.1449
```

8.14

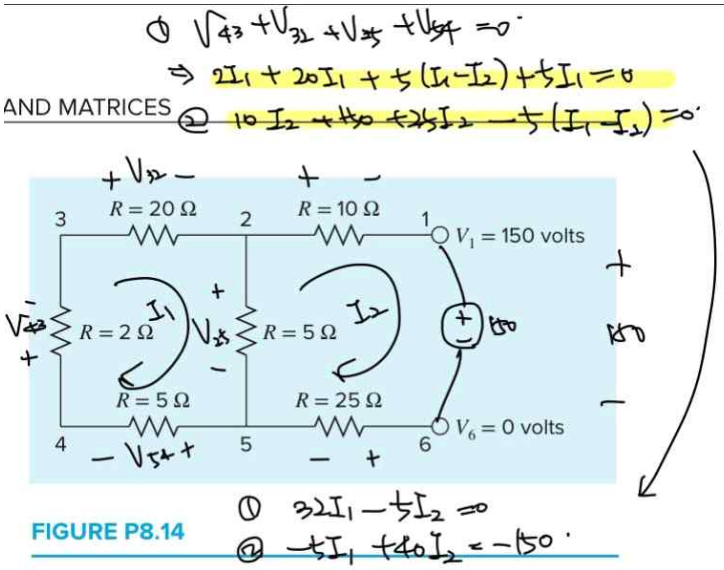


FIGURE P8.14

푼 방법

```
>> A = [32 -5; -5 40];
>> b = [0 -150]';
>> x = inv(A)*b

x =

   -0.5976
   -3.8247
```

나온 행렬을 대입

8.15

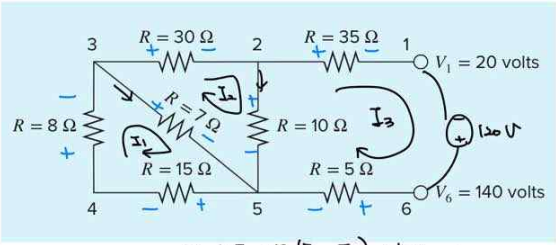


FIGURE P8.15

① $8I_1 + 7(I_1 - I_2) + 5I_1 = 0$ → $30I_1 - 7I_2 = 0$

② $3I_2 + 10(I_2 - I_3) - 7(I_1 - I_2) = 0$ → $-7I_1 + 47I_2 - 10I_3 = 0$

③ $3I_3 - 120 + 5I_3 - 10(I_2 - I_3) = 0$ → $-10I_2 + 50I_3 = 120$

푼 방법

```
>> A = [30 -7 0; -7 47 -10; 0 -10 50];
>> b = [0 0 120]';
>> x = inv(A)*b

x =

    0.1291
    0.5534
    2.5107
```

나온 행렬을 대입

9.7

9.7 Given the equations

$$2x_1 - 6x_2 - x_3 = -38$$
$$-3x_1 - x_2 + 7x_3 = -34$$
$$-8x_1 + x_2 - 2x_3 = -20$$

(a) Solve by Gauss elimination with partial pivoting. As part of the computation, use the diagonal elements to calculate the determinant. Show all steps of the computation.

(b) Substitute your results into the original equations to check your answers.

Sol)
$$\left[\begin{array}{ccc|c} 2 & -6 & -1 & -38 \\ -3 & -1 & 7 & -34 \\ -8 & 1 & -2 & -20 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 2 & -6 & -1 & -38 \\ 0 & -20 & 11 & -182 \\ -8 & 1 & -2 & -20 \end{array}\right]$$

$$\Rightarrow \left[\begin{array}{ccc|c} 2 & -6 & -1 & -38 \\ 0 & -20 & 11 & -182 \\ 0 & -23 & -6 & -172 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 2 & -6 & -1 & -38 \\ 0 & -20 & 11 & -182 \\ 0 & 0 & 1 & -2 \end{array}\right]$$

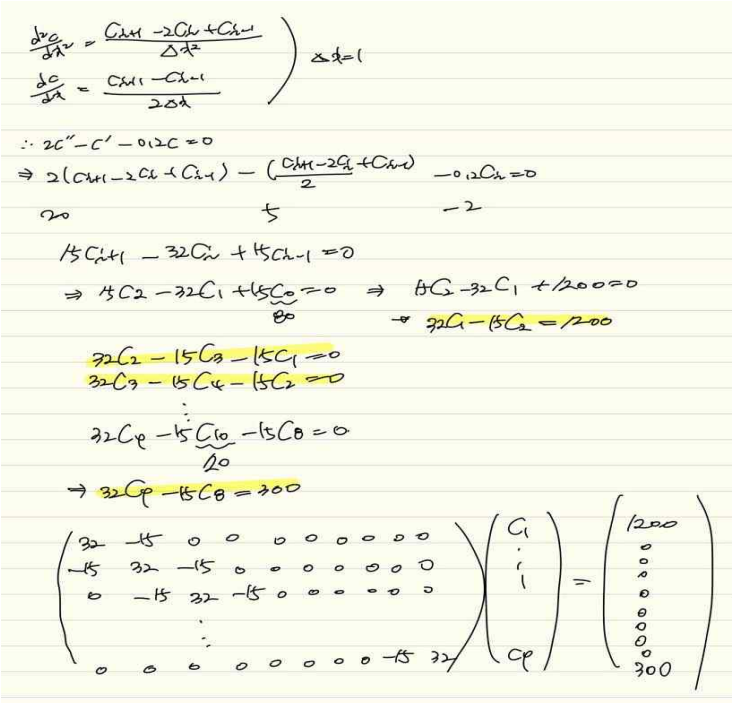
$\therefore$ $2x_1 - 6x_2 - x_3 = -38$
$-20x_2 + 11x_3 = -182$
$x_3 = -2$

$x_3 = -2$, $x_2 = 8$, $x_1 = 4$.

```
>> A = [2 -6 -1; -3 -1 7; -8 1 -2];
>> det(A)

ans =

  373.0000

>> b = [-38 -34 -20]';
>> x = A\b

x =

     4
     8
    -2
```

det(A)는 왜 다른지 모르겠다. 행변환을 어떻게 하느냐에 따라 다르지 않을까? 조금 더 공부해야겠다.

9.12

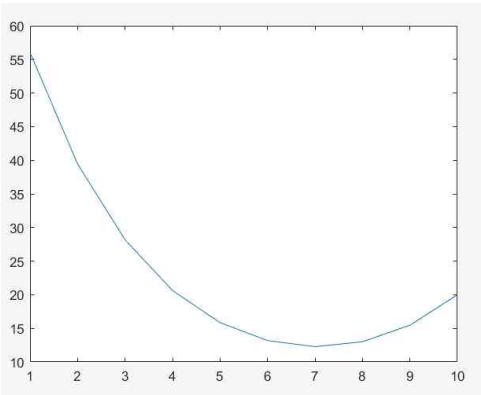


손으로 행렬식 만들기

```
A =

    32   -15     0     0     0     0     0     0     0
   -15    32   -15     0     0     0     0     0     0
     0   -15    32   -15     0     0     0     0     0
     0     0   -15    32   -15     0     0     0     0
     0     0     0   -15    32   -15     0     0     0
     0     0     0     0   -15    32   -15     0     0
     0     0     0     0     0   -15    32   -15     0
     0     0     0     0     0     0   -15    32   -15
     0     0     0     0     0     0     0   -15    32
```

```
b =

        1200
           0
           0
           0
           0
           0
           0
           0
         300

>> c = AWb

c =

   55.9903
   39.4460
   28.1611
   20.6311
   15.8519
   13.1863
   12.2788
   13.0086
   15.4728
```

손으로 푼 수식대로 행렬입력



plot 결과