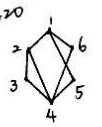
機構設計 HW6 參考

HW6 :

(1)

1. Find $C_p(A)$ of graph #20 and 25 in P.4-15 by inspection.

Ans: #20

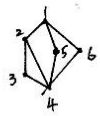


$N=6$

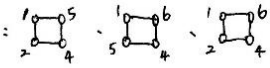
$C_p = P_0x^6 + P_1x^5 + P_2x^4 + P_3x^3 + P_4x^2 + P_5x^1 + P_6$

$P_0 = 1,\ P_1 = 0$

P_2 : : $P_2 = -8$



P_3 :  : 2-3-4 $\Rightarrow P_3 = -7\times1 = -2$

P_4 :  :  $= -2\times3 = -6$

 : 1-2 {3-4, 4-5, 1-6, 4-6} 、 2-3 {1-5, 4-5, 1-6, 4-6} 、 3-4 {1-2, 1-5, 1-6} 、 4-5 {1-2, 2-3, 1-6} 、 1-5 {2-4, 2-3, 3-4, 4-6} 、 4-6 {1-2, 2-3, 1-5} 、 2-4 {1-5, 1-6} 、 1-6 {2-3, 3-4, 2-4, 4-5}

$\frac{1}{2}\times26 = 13$

$P_4 = -6 + 13 = 7$

P_5 :  : 1-2-3-4-5 、 1-2-3-4-6 : $-2\times2 = -4$

 : 2 $\Rightarrow 2\times2 = 4$ $\Rightarrow P_5 = -4+4 = 0$

P_6 :  : 0

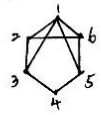
 : 1 $\Rightarrow 2\times1 = 2$

 : 0

 : 2-3 & 1-5 & 4-6 、 2-3 & 1-6 & 4-5 $\Rightarrow -1\times2 = -2$ $\Rightarrow P_6 = 2-2 = 0$

$\Rightarrow C_p = x^6 - 8x^4 - 2x^3 + 7x^2$

#25

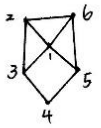


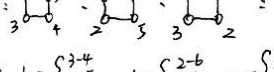
$C_p = P_0x^6 + P_1x^5 + P_2x^4 + P_3x^3 + P_4x^2 + P_5x^1 + P_6$

$P_0 = 1,\ P_1 = 0$

P_2 : : $P_2 = -9$

P_3 :  : $-2\times3 = -6$



P_4 :  :  $= -2\times3 = -6$

 : 1-2 {3-4, 4-5, 5-6} 、 1-3 {2-6, 5-6, 4-5} 、 1-5 {3-4, 2-3, 2-6} 、 1-6 {2-3, 3-4, 4-5} 、 2-3 {1-5, 1-6, 5-6, 4-5} 、 2-6 {1-3, 1-5, 3-4, 4-5} 、 3-4 {1-2, 1-5, 2-6, 5-6, 1-6} 、 4-5 {1-2, 1-3, 1-6, 2-3, 2-6} 、 5-6 {1-2, 1-3, 3-4, 2-3}

$\frac{1}{2}\times34 = 17$

$P_4 = -6 + 17 = 11$

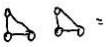
P_5 :  : 1-2-3-4-5 、 1-3-4-5-6 、 2-3-4-5-6 、 1-3-2-5-6 : $-2\times4 = -8$

 : 1-2-6 {3-4, 4-5} 、 1-2-3 {4-5, 5-6} 、 1-5-6 {2-3, 3-4} $\Rightarrow 2\times6 = 12$

$P_5 = -8 + 12 = 4$

P_6 :  : 1-2-3-4-5-6 、 1-6-2-3-4-5 、 1-2-6-5-4-3 : $-2\times3 = 6$

 : 1-3-4-5 & 2-6 、 1-2-5-6 & 3-4 、 1-3-2-6 & 4-5 : $2\times3 = 6$

 : 0

 : 1-2 & 3-4 & 5-6 、 1-3 & 2-6 & 4-5 、 1-6 & 2-3 & 4-5 、 1-5 & 2-6 & 3-4 : $-1\times4 = -4$

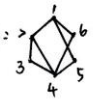
$P_6 = -6 + 6 - 4 = -4$

$\Rightarrow C_p = x^6 - 9x^4 - 6x^3 + 11x^2 + 4x - 4$ #

(2)

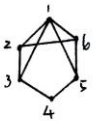
2. Find $C_P(DM)$ of graph #20 and 25 in P4-15.

Ans:



$$A = \begin{bmatrix} 0&1&0&0&1&1 \\ 1&0&1&1&0&0 \\ 0&1&0&1&0&0 \\ 0&1&1&0&1&1 \\ 1&0&0&1&0&0 \\ 1&0&0&1&0&0 \end{bmatrix} \Rightarrow DM = \begin{bmatrix} 1&6&1&1&5&5 \\ 6&1&5&7&1&1 \\ 1&5&1&6&1&1 \\ 1&7&6&1&6&6 \\ 5&1&1&6&1&1 \\ 5&1&1&6&1&1 \end{bmatrix}$$

by matlab, $C_P(DM) = x^6 - 6x^5 - 260x^4 - 214x^3 + 3811x^2 - 448x$



$$A = \begin{bmatrix} 0&1&1&0&1&1 \\ 1&0&1&0&0&1 \\ 1&1&0&1&0&0 \\ 0&0&1&0&1&0 \\ 1&0&0&1&0&1 \\ 1&1&0&0&1&0 \end{bmatrix} \Rightarrow DM = \begin{bmatrix} 1&7&7&1&7&7 \\ 7&1&6&1&1&6 \\ 7&6&1&5&1&1 \\ 1&1&5&1&5&1 \\ 7&1&1&5&1&6 \\ 7&6&1&1&6&1 \end{bmatrix}$$

by matlab, $C_P(DM) = x^6 - 6x^5 - 345x^4 - 1176x^3 + 9267x^2 + 19150x - 81800$

Ex: find CP(DM) by matlab:

```
syms x
DM = sym([1 6 1 1 5 5;
          6 1 5 7 1 1;
          1 5 1 6 1 1;
          1 7 6 1 6 6;
          5 1 1 6 1 1;
          5 1 1 6 1 1]);
charpoly(DM, x)
```

```
ans =

x^6 - 6*x^5 - 260*x^4 - 214*x^3 + 3811*x^2 - 448*x
```

(3)

3. Find the graph of a KC with a code 4023

Ans: $4023 = 2^{11} + 2^{10} + 2^9 + 2^8 + 2^7 + 2^5 + 2^4 + 2^2 + 2^1 + 2^0$

$\Rightarrow \underline{00011}\ \underline{1110}\ \underline{110}\ \underline{11}\ \underline{1} \Rightarrow \sqcup TAM = \begin{bmatrix} 0&0&0&0&1&1 \\ 0&0&1&1&1&0 \\ 0&1&0&1&1&0 \\ 0&1&1&0&1&1 \\ 1&1&1&1&0&1 \\ 1&0&0&1&1&0 \end{bmatrix} \Rightarrow$