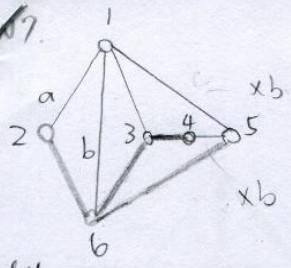
機構設計 HW7 HW8 參考

HW7 :

HW7.



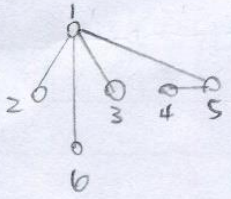
1.0/1.0

1. and 4.

f.c 1: (2, 6) (1)
f.c 2: (3, 6) (1)
f.c 3: (5, 6) (1)
f.c 4: (3, 4) — (1) case (a); (5) case (b)

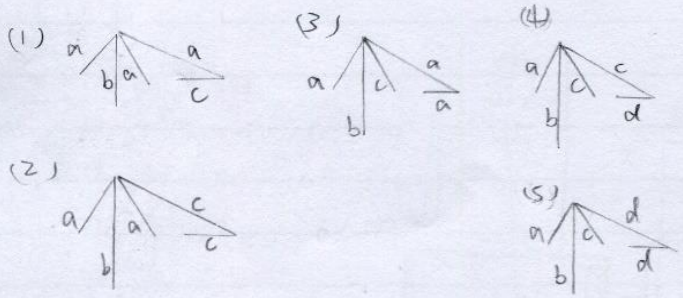
transfer vertices: (1)(5) or (1)
(1)(5) → case (b)
(1) → case (a)

2. spanning tree

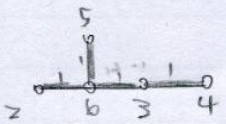


(1,2) (1, 6) (1,3) (1,5) (4,5)

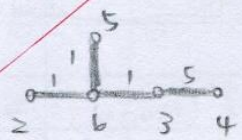
a — b — a — a — c — (1)
a — b — a — c — c — (2)
a — b — c — a — a — (3)
a — b — c — a — a — 不行 (沒有相鄰)
a — b — c — a — d — (4)
a — b — d — d — (5)



3. case (a):

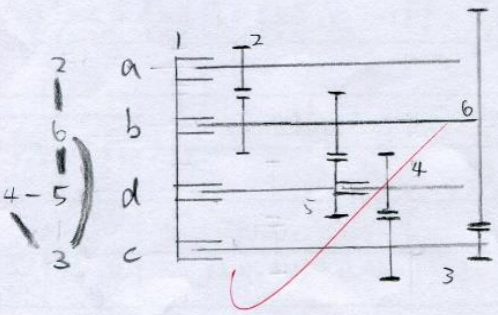


case (b)



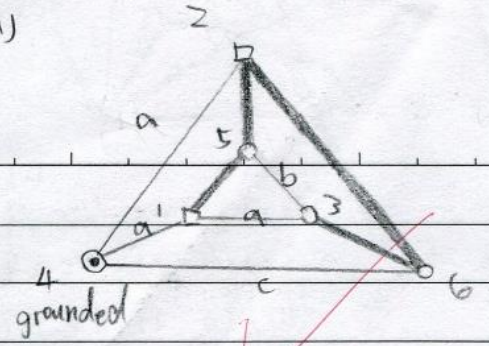
5. for (5)

a: 2
b: 6
c: 3
d: 4 5



HW8 :

(a)



1.0 / 1.0

(b) fc 1 (1,5)(3)

fc 2 (2,5)(3)

fc 3 (2,6)(4)

fc 4 (3,6)(4)

(c)

$$\begin{bmatrix} 1 & 0 & r_{5,1}-1 & -r_{5,1} & 0 \\ 0 & 1 & r_{5,2}-1 & -r_{5,2} & 0 \\ 0 & 1 & 0 & 0 & -r_{6,2} \\ 0 & 0 & 1 & 0 & -r_{6,3} \end{bmatrix} \begin{bmatrix} w_1 \\ w_2 \\ w_3 \\ w_5 \\ w_6 \end{bmatrix}$$

$w_3 = r_{6,3} w_6$; $w_2 = r_{6,2} w_6$; $w_2 = -(r_{5,2}-1) w_3 + r_{5,2} w_5$

$w_1 = -(r_{5,1}-1) w_3 + r_{5,1} w_5$

$\Rightarrow w_3 = \frac{r_{6,3}}{r_{6,2}} w_2$; $w_2 = -(r_{5,2}-1) \cdot \frac{r_{6,3}}{r_{6,2}} w_2 + r_{5,2} w_5 \Rightarrow w_5 = \frac{1}{r_{5,2}} \left[1 + \frac{r_{6,3}}{r_{6,2}} (r_{5,2}-1) \right] w_2$

$\Rightarrow \frac{w_1}{w_2} = -(r_{5,1}-1) \frac{r_{6,3}}{r_{6,2}} + \frac{r_{5,1}}{r_{5,2}} \left[1 + \frac{r_{6,3}}{r_{6,2}} (r_{5,2}-1) \right] = \frac{r_{6,3}}{r_{6,2}} + \frac{r_{5,1}}{r_{5,2}} \left(1 - \frac{r_{6,3}}{r_{6,2}} \right)$

$\frac{w_2}{w_1} = \frac{1}{\frac{r_{6,3}}{r_{6,2}} + \frac{r_{5,1}}{r_{5,2}} \left(1 - \frac{r_{6,3}}{r_{6,2}} \right)}$ where $r_{5,1} = -\frac{N_5}{N_1}$, $r_{6,3} = -\frac{N_6}{N_3}$ 內齒輪 ; $r_{5,2} = \frac{N_5}{N_2}$, $r_{6,2} = \frac{N_6}{N_2}$ 外齒輪

$\Rightarrow \frac{w_2}{w_1} = \frac{1}{-\frac{N_2}{N_3} - \frac{N_2}{N_1} \left(1 + \frac{N_2}{N_3} \right)} = -\frac{N_1 N_3}{N_1 N_2 + N_2^2 + N_2 N_3}$

$= -\frac{N_1 N_3}{N_1 N_2 + N_2^2 + N_2 N_3}$ #