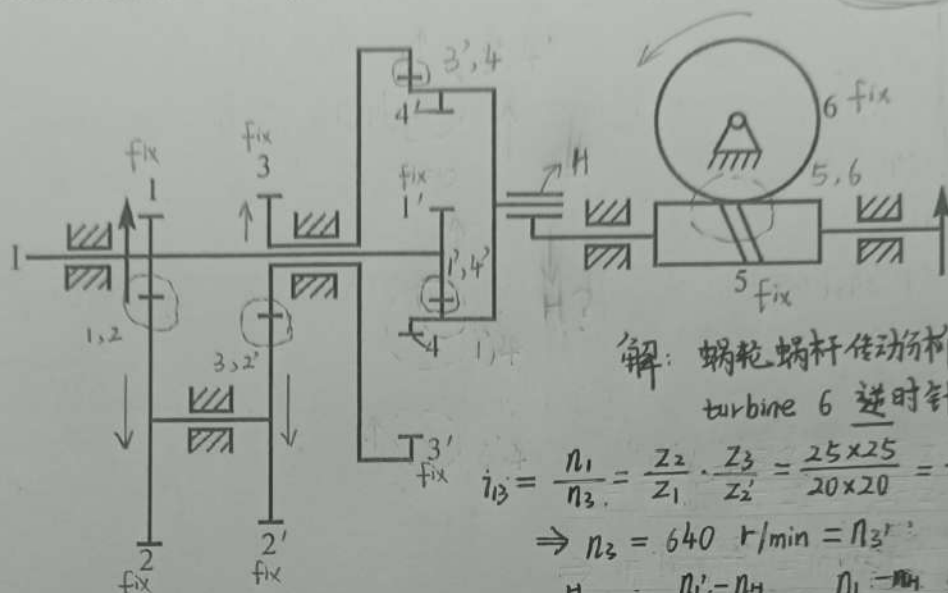


Q1.

In the gear train shown below $[z_1' = 15, z_4' = 30, z_4 = 45, z_3' = 60, z_3 = 25, z_2' = 20, z_2 = 25, z_1 = 20, z_5 = 1, z_6 = 40]$, rotational speed of axis I $[n_1 = 1000 \text{ r/min}]$, the direction of n_1 is shown in the figure.

Please determine the magnitude and direction of angular speed of turbine 6.



解: 蜗轮蜗杆传动分析
turbine 6 逆时针转动

$$i_{13} = \frac{n_1}{n_3} = \frac{z_2}{z_1} \cdot \frac{z_3}{z_2'} = \frac{25 \times 25}{20 \times 20} = \frac{25}{16}$$

$$\Rightarrow n_3 = 640 \text{ r/min} = n_{3'}$$

$$i_{1'3'} = \frac{n_{1'} - n_H}{n_{3'} - n_H} = \frac{n_1 - n_H}{n_3 - n_H} = \frac{z_4'}{z_1'} \cdot \frac{z_3'}{z_4} = \frac{30 \times 60}{15 \times 45} = \frac{8}{3}$$

Q2.

The following figure shows a differential gear train in a mechanical loom. $\Rightarrow n_H = 424 \text{ r/min}$

Suppose:

$$z_1 = 30, z_2 = 25, z_3 = z_4 = 24, z_5 = 18, z_6 = 121,$$

$$n_1 = 48 \sim 200 \text{ r/min}, n_H = 316 \text{ r/min}$$

Please calculate n_6 .

$$n_H = n_5$$

$$\frac{n_1}{n_5} = \frac{z_5}{z_1}$$

$$\Rightarrow n_6 = \frac{1}{40} \times 424 = 10.6 \text{ r/min}$$

ANS

解:

$$i_{16}^H = \frac{n_1 - n_H}{n_6 - n_H} = + \frac{z_2 z_4 z_6}{z_1 z_3 z_5} = \frac{605}{108}$$

$$\Rightarrow n_6 = \frac{108}{605} (n_1 - n_H) + n_H$$

$$= \frac{108}{605} n_1 + \frac{497}{605} n_H$$

$$\approx 268 \sim 295 \text{ r/min}$$

