

HASIL PENGAMATAN DAN ANALISIS DATA

Hasil Pengamatan

Kegiatan 1. Jarak Fokus Lensa Cembung

Jarak Fokus Lensa Positif 2 = +100 mm = +10 cm

Tabel 1. Jarak fokus lensa cembung dengan merajah $1/s$ terhadap $1/s'$

No	Jarak benda (s) (cm)	Jarak bayangan (s') (cm)
1	$ 18,80 \pm 0,05 $	$ 27,20 \pm 0,05 $
2	$ 16,40 \pm 0,05 $	$ 35,70 \pm 0,05 $
3	$ 15,00 \pm 0,05 $	$ 43,50 \pm 0,05 $
4	$ 14,90 \pm 0,05 $	$ 44,60 \pm 0,05 $
5	$ 14,00 \pm 0,05 $	$ 48,30 \pm 0,05 $
6	$ 13,40 \pm 0,05 $	$ 50,70 \pm 0,05 $
7	$ 13,20 \pm 0,05 $	$ 54,50 \pm 0,05 $
8	$ 13,10 \pm 0,05 $	$ 59,10 \pm 0,05 $
9	$ 12,80 \pm 0,05 $	$ 62,30 \pm 0,05 $
10	$ 12,50 \pm 0,05 $	$ 66,10 \pm 0,05 $

Kegiatan 2. Jarak fokus lensa cekung

Jarak fokus lensa cekung = - 10 cm = - 100 mm

NST mistar = 0,1 cm

Tabel 2. Jarak fokus lensa cekung dengan merajah $1/s$ terhadap $1/s'$

No	Jarak benda (s) (cm)	Jarak bayangan (s') (cm)
1	$ -6,70 \pm 0,05 $	$ 14,20 \pm 0,05 $
2	$ -7,20 \pm 0,05 $	$ 24,70 \pm 0,05 $
3	$ -8,80 \pm 0,05 $	$ 34,40 \pm 0,05 $
4	$ -9,00 \pm 0,05 $	$ 41,50 \pm 0,05 $
5	$ -9,70 \pm 0,05 $	$ 45,70 \pm 0,05 $
6	$ -9,80 \pm 0,05 $	$ 49,80 \pm 0,05 $
7	$ -10,50 \pm 0,05 $	$ 55,80 \pm 0,05 $
8	$ -11,00 \pm 0,05 $	$ 57,90 \pm 0,05 $
9	$ -11,10 \pm 0,05 $	$ 59,80 \pm 0,05 $
10	$ -11,90 \pm 0,05 $	$ 63,90 \pm 0,05 $

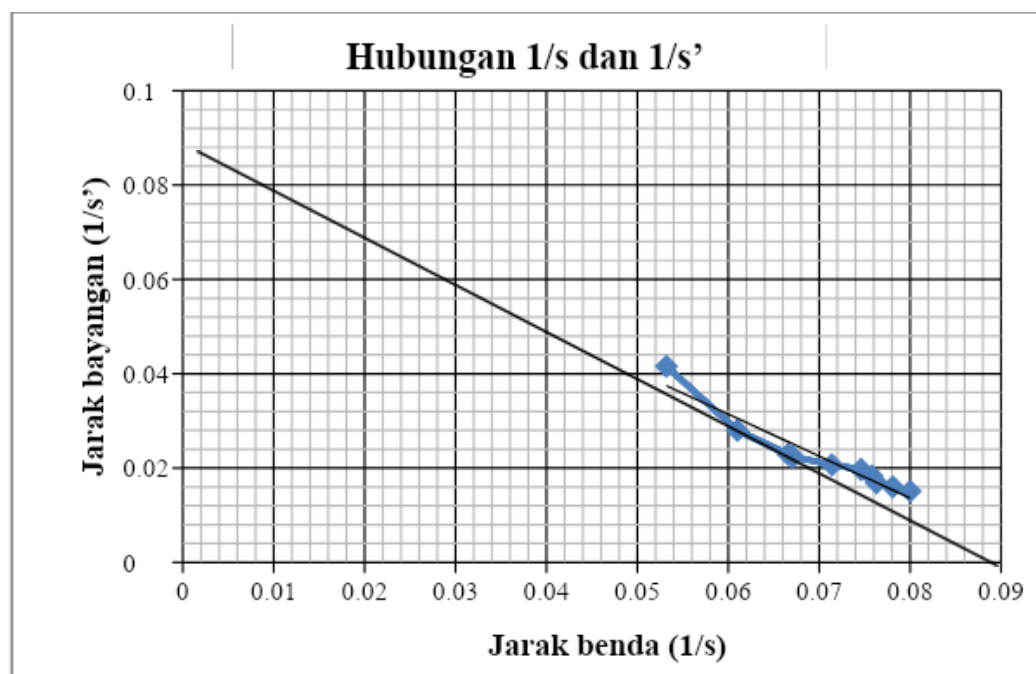
ANALISIS DATA

Kegiatan1.Jarak Fokus Lensa Cembung

Tabel. 3 Jarak fokus lensa cembung dengan merajah $1/s$ terhadap $1/s'$

No	Jarakbenda ($1/s$)	Jarakbayangan ($1/s'$)
1	0,0532	0,0416
2	0,0610	0,0280
3	0,0666	0,0229
4	0,0671	0,0224
5	0,0714	0,0207
6	0,0746	0,0197
7	0,0758	0,0183
8	0,0763	0,0169
9	0,0781	0,0160
10	0,0800	0,0151

Analisis grafik kegiatan 1



Grafik 1. Hubungan $1/s$ dan $1/s'$ untuk menentukan jarak fokus lensa cembung

A. Sumbu x

1. NST grafik pada sumbu x

$$\begin{aligned}\text{NST } \frac{1}{s} &= \frac{\text{batas skala}}{\text{banyaknya jumlah skala}} \\ &= \frac{0,02}{5} \\ &= 0,004 \text{ cm}\end{aligned}$$

2. Jarak fokus pada sumbu x

$$\begin{aligned}\Delta f &= \Delta \frac{1}{s} = \frac{1}{2} NST \\ &= 0,002 \text{ cm}\end{aligned}$$

$$\begin{aligned}\frac{1}{s} &= PS \times NST \\ &= 24 \times 0,004 \\ &= 0,096 \text{ cm}\end{aligned}$$

$$\frac{1}{f} = \frac{1}{s} + \frac{1}{s'}$$

$$\frac{1}{s'} = 0$$

$$\frac{1}{f} = \frac{1}{s}$$

$$\frac{1}{f_1} = 0,096 \text{ cm}$$

$$f_x = \frac{1}{0,096}$$

$$= 10,41 \text{ cm}$$

$$KR = \frac{\Delta f}{f_x} \times 100\%$$

$$= \frac{0,002}{10,41} \times 100\%$$

$$= 0,02 \% (4 \text{ AB})$$

$$f_x = |f_x \pm \Delta f|$$

$$f_x = |10,41 \pm 0,002| \text{ cm}$$

B. Sumbu y

1. NST grafik pada sumbu y

$$\begin{aligned}\text{NST } \frac{1}{s} &= \frac{\text{batas skala}}{\text{banyaknya jumlah skala}} \\ &= \frac{0,02}{5} \\ &= 0,004 \text{ cm}\end{aligned}$$

2. Jarak fokus pada sumbu y

$$\Delta f = \Delta \frac{1}{s} = \frac{1}{2} NST$$

$$= \frac{1}{2} 0,004 \text{ cm}$$

$$= 0,002 \text{ cm}$$

$$\frac{1}{s} = PS \times NST$$

$$= 22 \times 0,004$$

$$= 0,088 \text{ cm}$$

$$\frac{1}{f} = \frac{1}{s} + \frac{1}{s'}$$

$$\frac{1}{s'} = 0$$

$$\frac{1}{f} = \frac{1}{s}$$

$$\frac{1}{f_y} = 0,092 \text{ cm}$$

$$f_y = \frac{1}{0,088} \text{ cm}$$

$$= 11,36 \text{ cm}$$

$$KR = \frac{\Delta f}{f_y} \times 100\%$$

$$= \frac{0,002}{11,36} \times 100\%$$

$$= 0,017 \% (4 \text{ AB})$$

$$f_y = |f_y \pm \Delta f|$$

$$f_y = |11,360 \pm 0,002| \text{ cm}$$

C. Jarak fokus pada lensa cembung

1. Jarak fokus

$$\bar{f} = \frac{f_x + f_y}{2}$$

$$\bar{f} = \frac{10,41 \text{ cm} + 11,36 \text{ cm}}{2}$$

$$\bar{f} = \frac{21,77 \text{ cm}}{2 \text{ cm}}$$

$$\bar{f} = 10,885 \text{ cm}$$

$$KR = \frac{\Delta \bar{f}}{\bar{f}} \times 100\%$$

$$KR = \frac{0,002}{10,885} \times 100\%$$

$$KR = 0,018\% \text{ (4 AB)}$$

Karena ketidakpastian antara sumbu x dan sumbu y adalah sama, jadi jarak fokus lensa cembung :

$$\bar{f} = |\bar{f} \pm \Delta \bar{f}|$$

$$\bar{f} = |10,885 \pm 0,002| \text{ cm}$$

2. Persen perbedaan

$$\% \text{perbedaan} = \left| \frac{\text{praktikum} - \text{teori}}{\frac{\text{praktikum} + \text{teori}}{2}} \right| \times 100\%$$

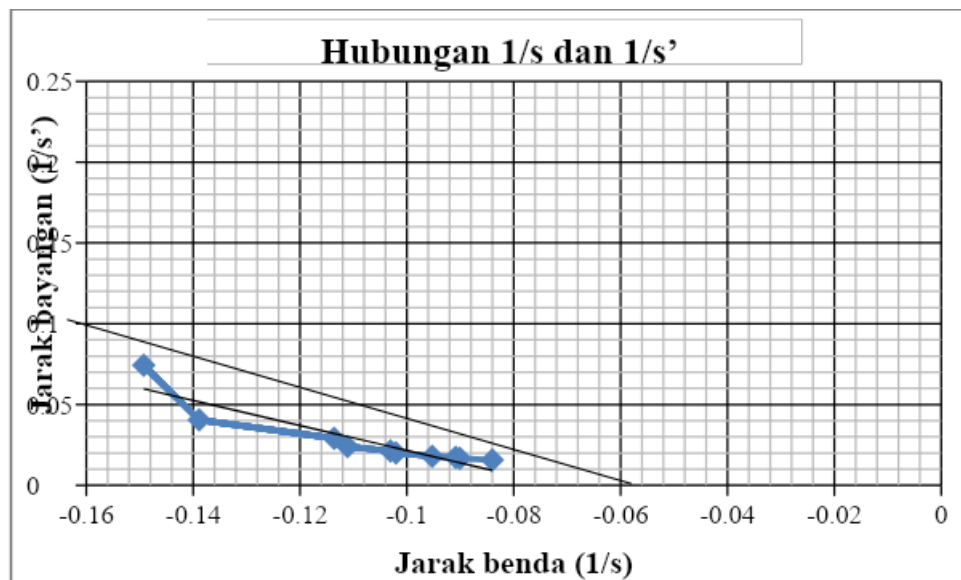
$$\% \text{perbedaan} = \left| \frac{10,885 \text{ cm} - 10,00 \text{ cm}}{\frac{10,885 \text{ cm} + 10,00 \text{ cm}}{2}} \right| \times 100\% = \left| \frac{0,885}{10,442} \right| \times 100\% = 8,4 \%$$

Kegiatan2. Jarak Fokus Lensa Cekung

Tabel 4. Jarak fokus lensa cekung

No	Jarak benda ($1/s$)	Jarak bayangan ($1/s'$)
1	-0,14925	0,07422
2	-0,13888	0,04048
3	-0,11364	0,02906
4	-0,11111	0,02409
5	-0,10309	0,02118
6	-0,10204	0,02008
7	-0,09524	0,01792
8	-0,09090	0,01727
9	-0,09009	0,01672
10	-0,08403	0,01564

Analisis grafik kegiatan 2



Grafik 2. Hubungan $1/s$ dan $1/s'$ untuk menentukan jarak fokus lensa cekung

A. Sumbu x

1. NST grafik sumbu x

$$\begin{aligned} \text{NST } \frac{1}{s} &= \frac{\text{batas skala}}{\text{banyaknya jumlah skala}} \\ &= \frac{0,05}{5} \\ &= 0,01 \text{ cm} \end{aligned}$$

2. Jarak fokus pada sumbu x

$$\begin{aligned} \Delta f &= \Delta \frac{1}{s} = \frac{1}{2} NST \\ &= 0,005 \text{ cm} \end{aligned}$$

$$\begin{aligned} \frac{1}{s} &= PS \times NST \\ &= 7,5 \times 0,01 \\ &= 0,075 \text{ cm} \end{aligned}$$

$$\frac{1}{f} = \frac{1}{s} + \frac{1}{s'}$$

$$\frac{1}{s'} = 0$$

$$\frac{1}{f} = \frac{1}{s}$$

$$\frac{1}{f_x} = 0,075 \text{ cm}$$

$$f_x = \frac{1}{0,075} \text{ cm}$$

$$= 13,3 \text{ cm}$$

$$KR = \frac{\Delta f}{f_x} \times 100\%$$

$$= \frac{0,005}{13,3} \times 100\%$$

$$= 0,03 \% (4 \text{ AB})$$

$$f_x = |f \pm \Delta f|$$

$$f_x = |13,30 \pm 0,005| \text{ cm}$$

B. Sumbu y

1. NST grafik pada sumbu y

$$\begin{aligned}\text{NST } \frac{1}{s} &= \frac{\text{batas skala}}{\text{banyaknya jumlah skala}} \\ &= \frac{0,05}{5} \\ &= 0,01 \text{ cm}\end{aligned}$$

2. Jarak fokus pada sumbu y

$$\begin{aligned}\Delta f &= \Delta \frac{1}{s} = \frac{1}{2} NST \\ &= \frac{1}{2} 0,01 \text{ cm} \\ &= 0,005 \text{ cm}\end{aligned}$$

$$\begin{aligned}\frac{1}{s} &= PS \times NST \\ &= 10 \times 0,01 \\ &= 0,10 \text{ cm}\end{aligned}$$

$$\frac{1}{f} = \frac{1}{s} + \frac{1}{s'}$$

$$\frac{1}{s'} = 0$$

$$\frac{1}{f} = \frac{1}{s}$$

$$\frac{1}{f_y} = 0,10 \text{ cm}$$

$$\begin{aligned}f_y &= \frac{1}{0,10} \text{ cm} \\ &= 10 \text{ cm}\end{aligned}$$

$$\begin{aligned}KR &= \frac{\Delta f}{f_y} \times 100\% \\ &= \frac{0,005}{10} \times 100\% \\ &= 0,05 \% (4 \text{ AB})\end{aligned}$$

$$f_y = |f \pm \Delta f|$$

$$f_y = |10,00 \pm 0,05| \text{cm}$$

C. Jarak fokus lensa cekung

1. Jarak fokus

$$\begin{aligned}\bar{f} &= \frac{f_x + f_y}{2} \\ &= \frac{13,30 \text{ cm} + 10,00 \text{ cm}}{2} \\ &= \frac{23,3 \text{ cm}}{2 \text{ cm}} \\ &= 11,65 \text{ cm}\end{aligned}$$

$$KR = \frac{\Delta \bar{f}}{\bar{f}} \times 100\%$$

$$KR = \frac{0,005}{11,65} \times 100\%$$

$$KR = 0,04 \% (4 \text{ AB})$$

Karena ketidakpastian antara sumbu x dan sumbu y adalah sama, jadi jarak fokus lensa cekung :

$$\bar{f} = |\bar{f} \pm \Delta \bar{f}|$$

$$\bar{f} = |11,650 \pm 0,005| \text{ cm}$$

3. Persen perbedaan

$$\% \text{perbedaan} = \left| \frac{\text{praktikum} - \text{teori}}{\frac{\text{praktikum} + \text{teori}}{2}} \right| \times 100\%$$

$$\% \text{perbedaan} = \left| \frac{11,650 \text{ cm} - 10,00 \text{ cm}}{\frac{11,650 \text{ cm} + 10,00 \text{ cm}}{2}} \right| \times 100\% = \left| \frac{1,65}{10,825} \right| \times 100\% = 15,24 \%$$