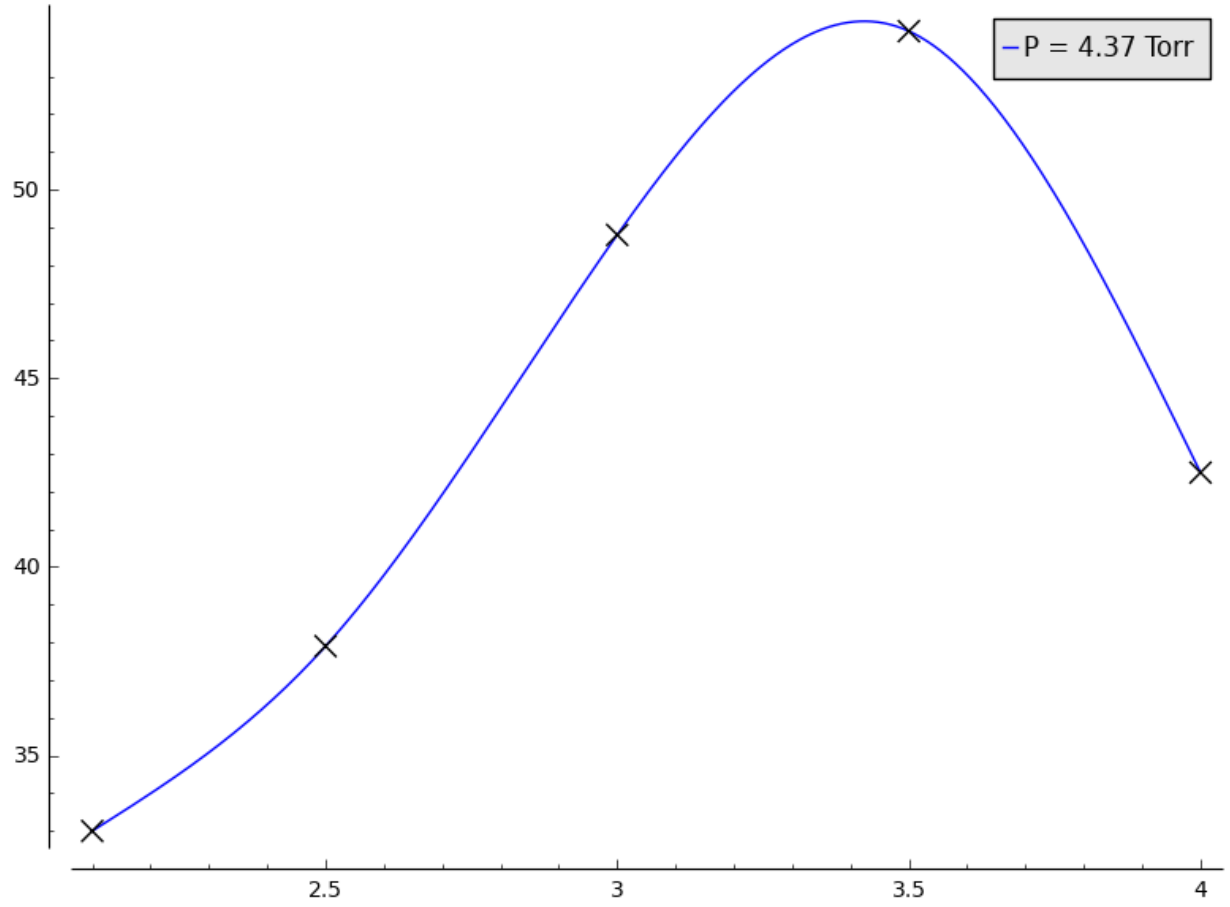
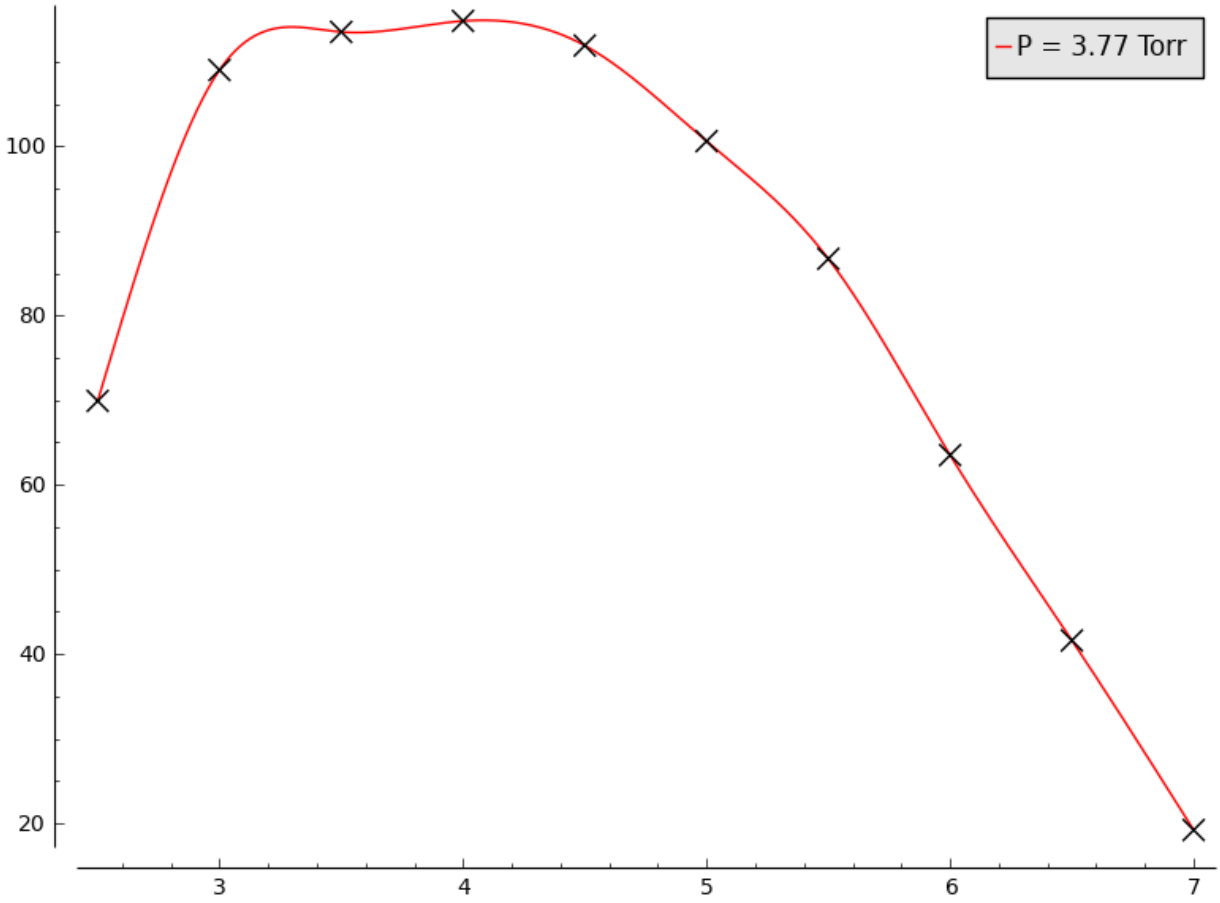
Experiment 3 - He-Ne Laser

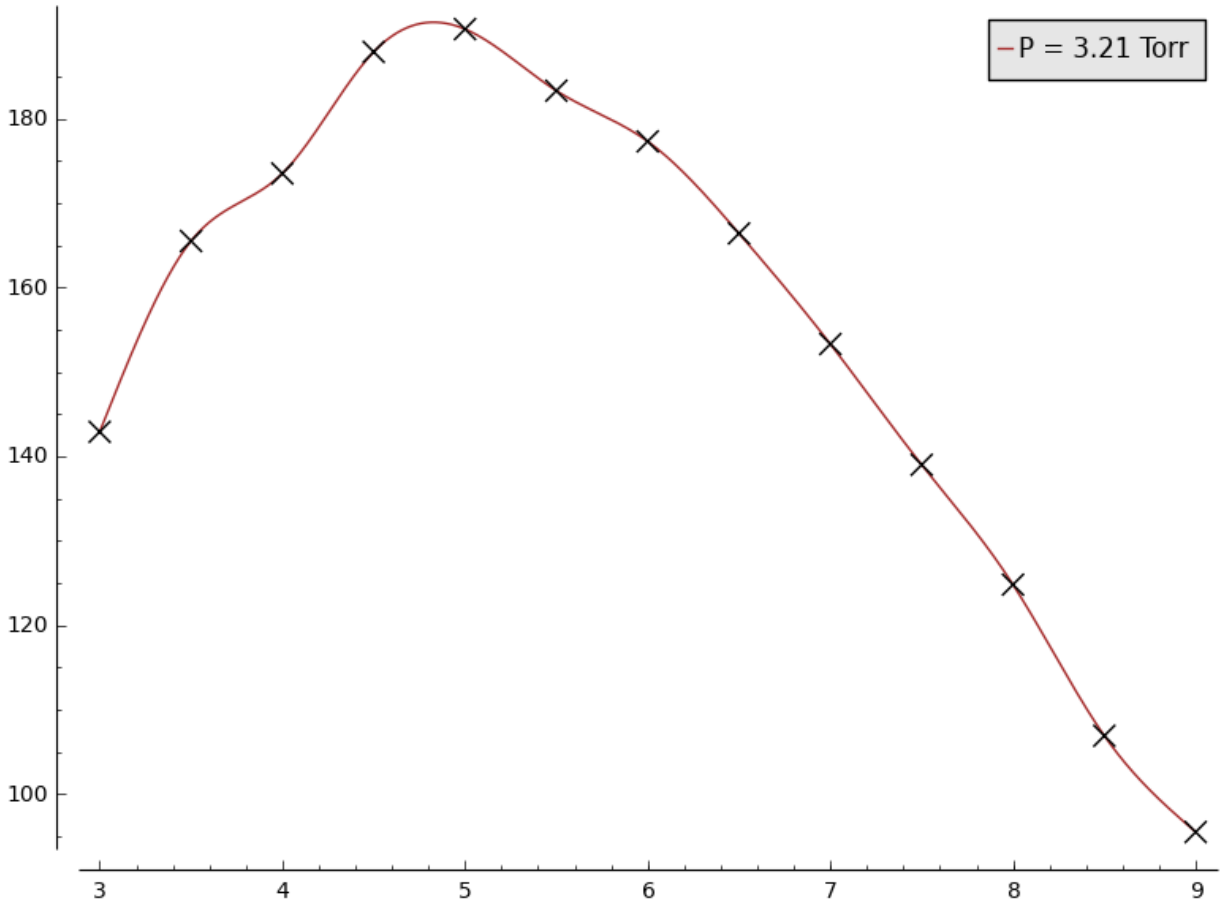
```
I_1 = [2.1,2.5,3.0,3.5,4.0]
P_1 = [33.0,37.9,48.8,54.2,42.5]
s_1 = spline(zip(I_1,P_1))
p_1 = plot(s_1,xmin=2.1,xmax=4.0,legend_label = "P = 4.37 Torr") +
scatter_plot(zip(I_1,P_1), marker = "x",markersize=100)
p_1
```



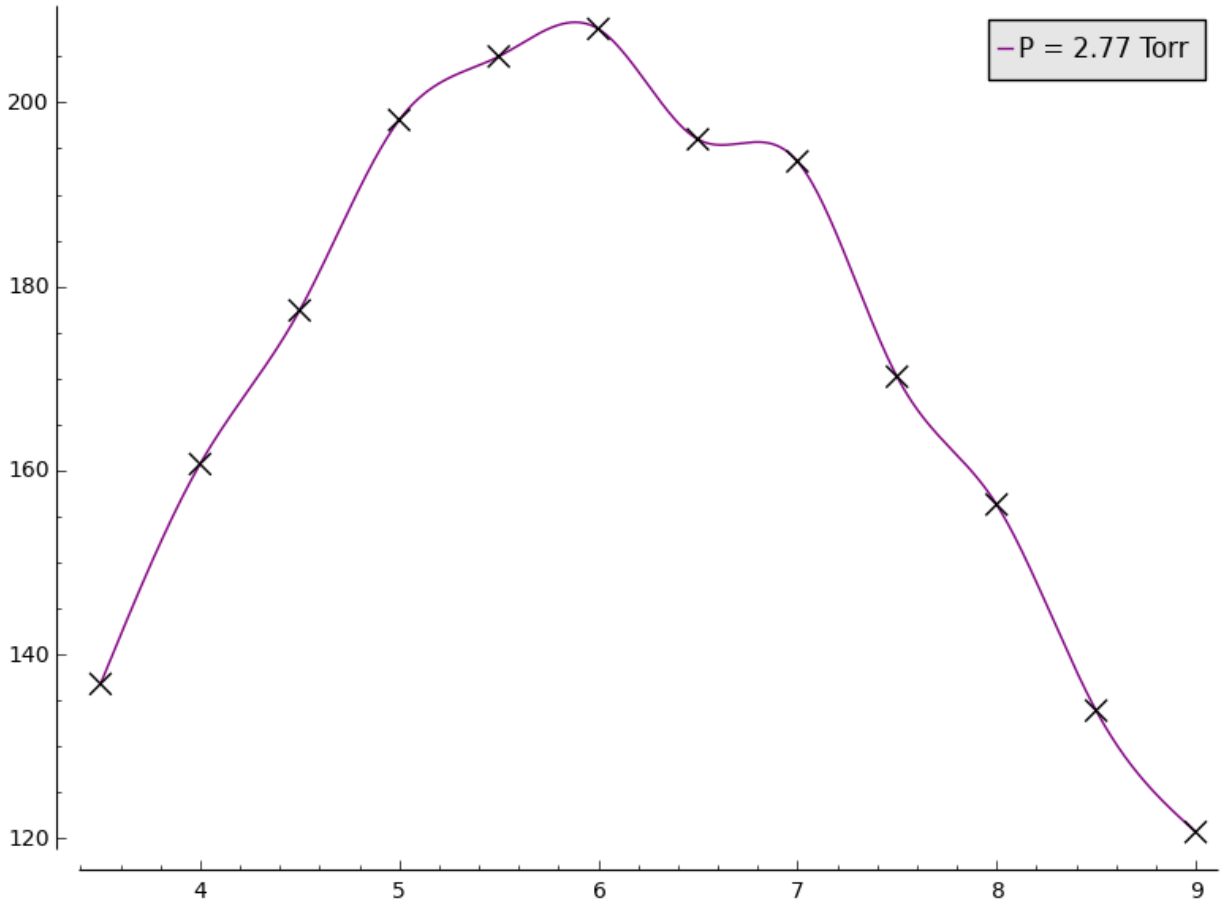

```
I_2 = [2.5,3.0,3.5,4.0,4.5,5.0,5.5,6.0,6.5,7.0]
P_2 = [69.9,109.0,113.5,114.8,111.9,100.6,86.7,63.5,41.6,19.2]
s_2 = spline(zip(I_2,P_2))
p_2 = plot(s_2,xmin=2.5,xmax=7.0,legend_label = "P = 3.77 Torr",color = "red") +
scatter_plot(zip(I_2,P_2), marker = "x",markersize=100)
p_2
```



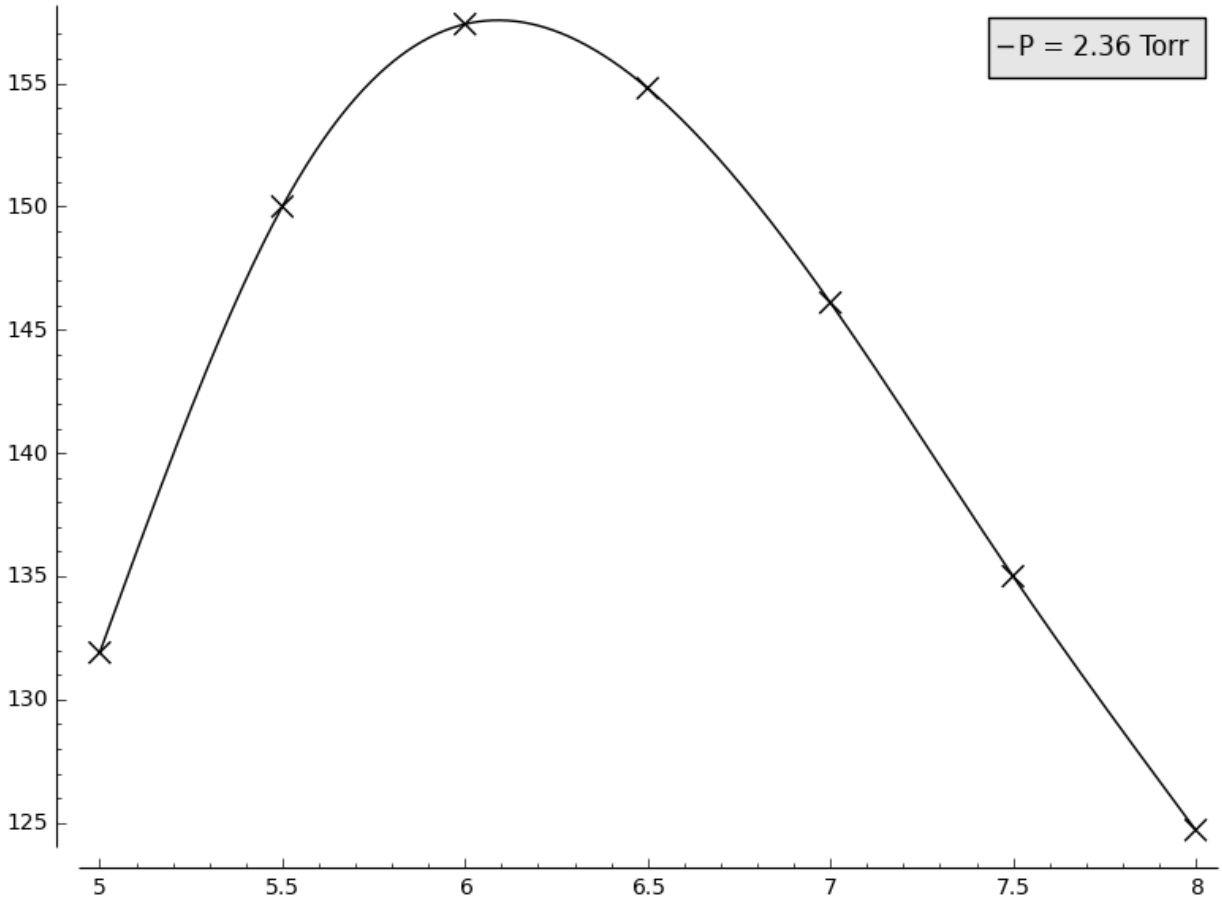

```
I_3 = [3.0,3.5,4.0,4.5,5.0,5.5,6.0,6.5,7.0,7.5,8.0,8.5,9.0]
P_3 = [142.9,165.5,173.5,187.9,190.6,183.3,177.3,166.4,153.3,139.0,124.8,106.9,95.5]
s_3 = spline(zip(I_3,P_3))
p_3 = plot(s_3,xmin=3.0,xmax=9.0,legend_label = "P = 3.21 Torr",color = "brown") +
scatter_plot(zip(I_3,P_3), marker = "x",markersize=100)
p_3
```



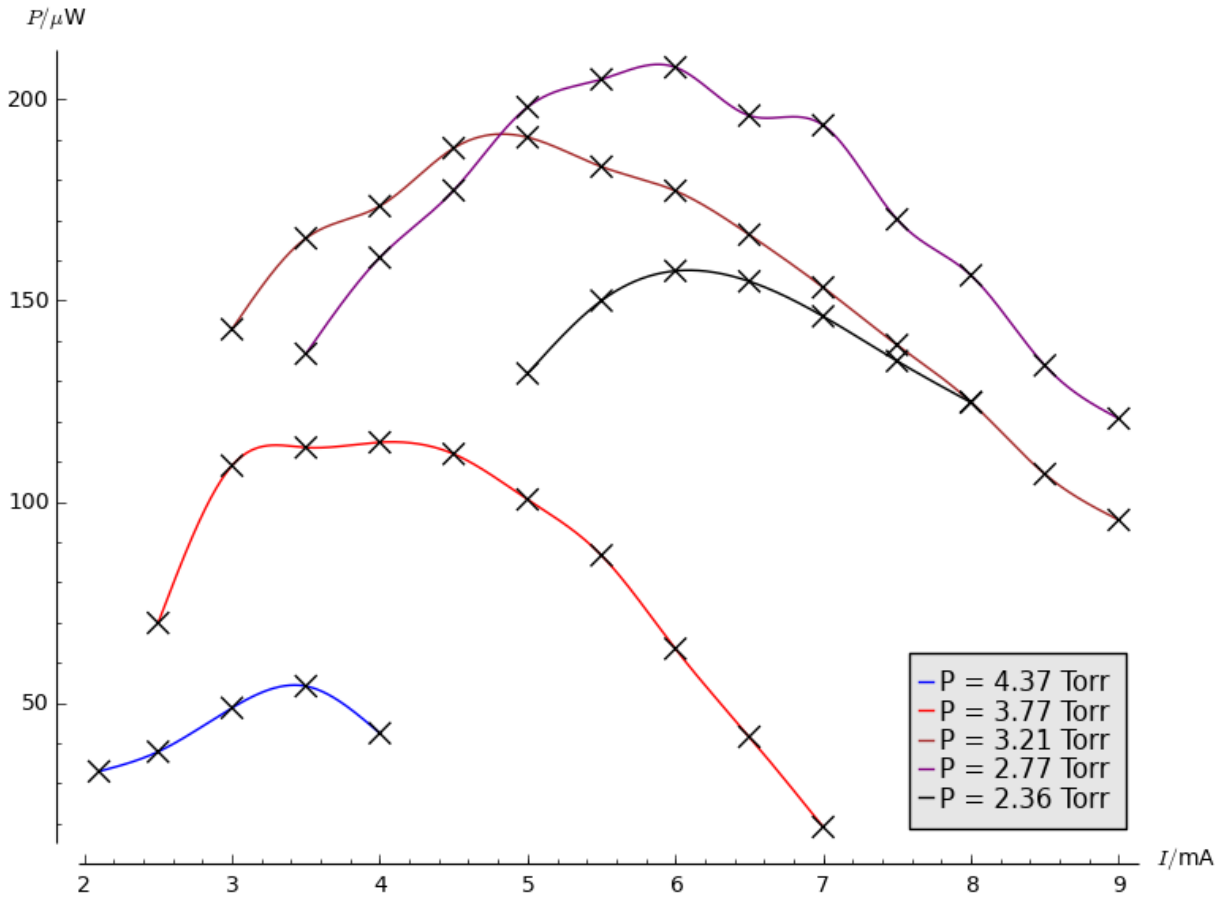

```
I_4 = [3.5,4.0,4.5,5.0,5.5,6.0,6.5,7.0,7.5,8.0,8.5,9.0]
P_4 = [136.8,160.7,177.4,198.1,205,208,196.0,193.6,170.2,156.3,133.9,120.7]
s_4 = spline(zip(I_4,P_4))
p_4 = plot(s_4,xmin=3.5,xmax=9.0,legend_label = "P = 2.77 Torr",color = "purple") +
scatter_plot(zip(I_4,P_4), marker = "x",markersize=100)
p_4
```




```
I_5 = [5.0,5.5,6.0,6.5,7.0,7.5,8.0]
P_5 = [131.9,150.0,157.4,154.8,146.1,135.0,124.7]
s_5 = spline(zip(I_5,P_5))
p_5 = plot(s_5,xmin=5.0,xmax=8.0,legend_label = "P = 2.36 Torr",color = "black") +
scatter_plot(zip(I_5,P_5), marker = "x",markersize=100)
p_5
```




```
show(p_1 + p_2 + p_3 + p_4 + p_5, axes_labels=["$I/$mA","$P/\mu$W"])
```



```
save(p_1 + p_2 + p_3 + p_4 + p_5, axes_labels=
["$I/$mA","$P/\mu$W"],filename="/usr/tmp/plot.pdf")
```

```
find_local_maximum(s_1,2.1,4.0)
```

```
    (54.462864207449904, 3.4235628022875035)
```

```
find_local_maximum(s_2,2.5,7.0)
```

```
    (114.88872145509204, 4.0822729920964687)
```

```
find_local_maximum(s_3,3.0,9.0)
```

```
    (191.4147177646373, 4.8274195035217069)
```

```
find_local_maximum(s_4,3.5,9.0)
```

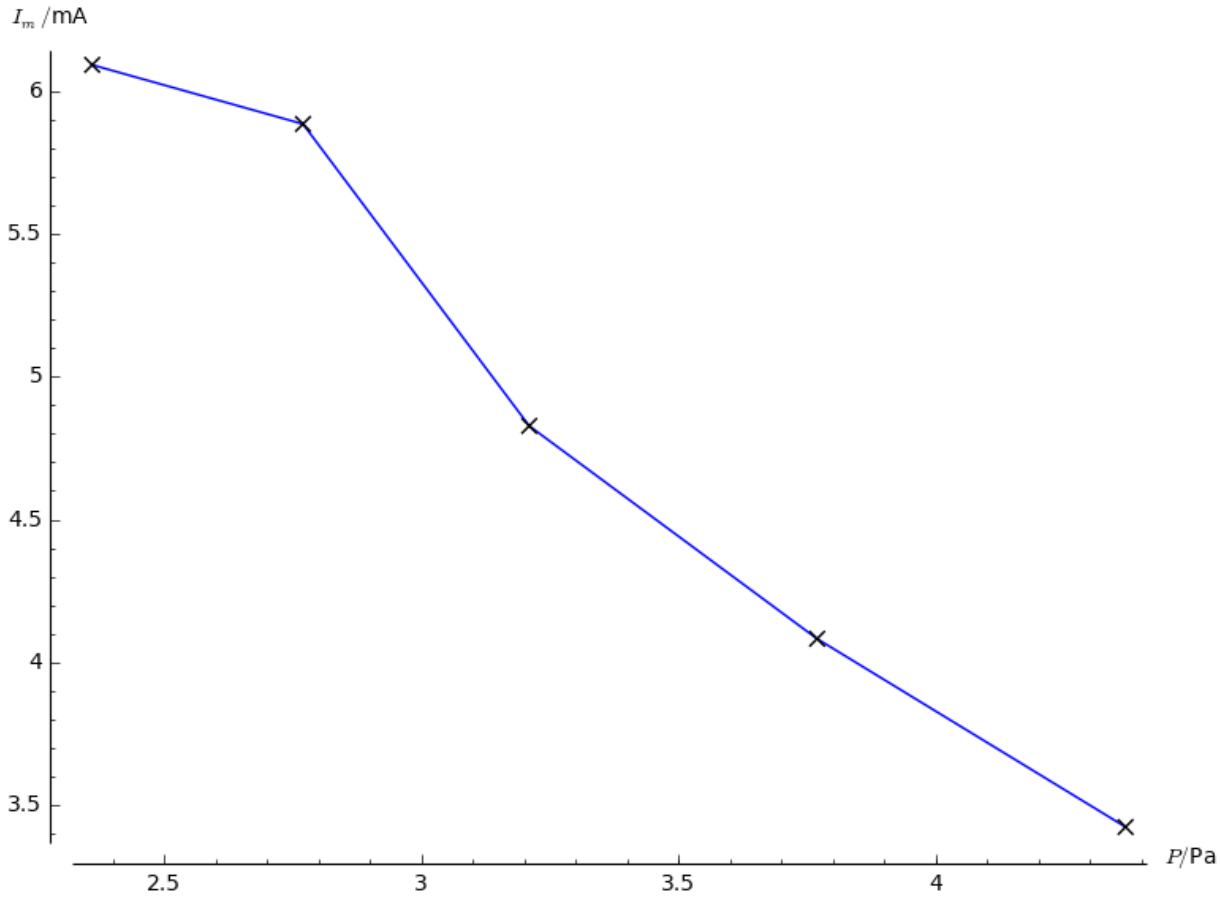
```
    (208.72450718529544, 5.8840072338287488)
```

```
find_local_maximum(s_5,5.0,8.0)
```

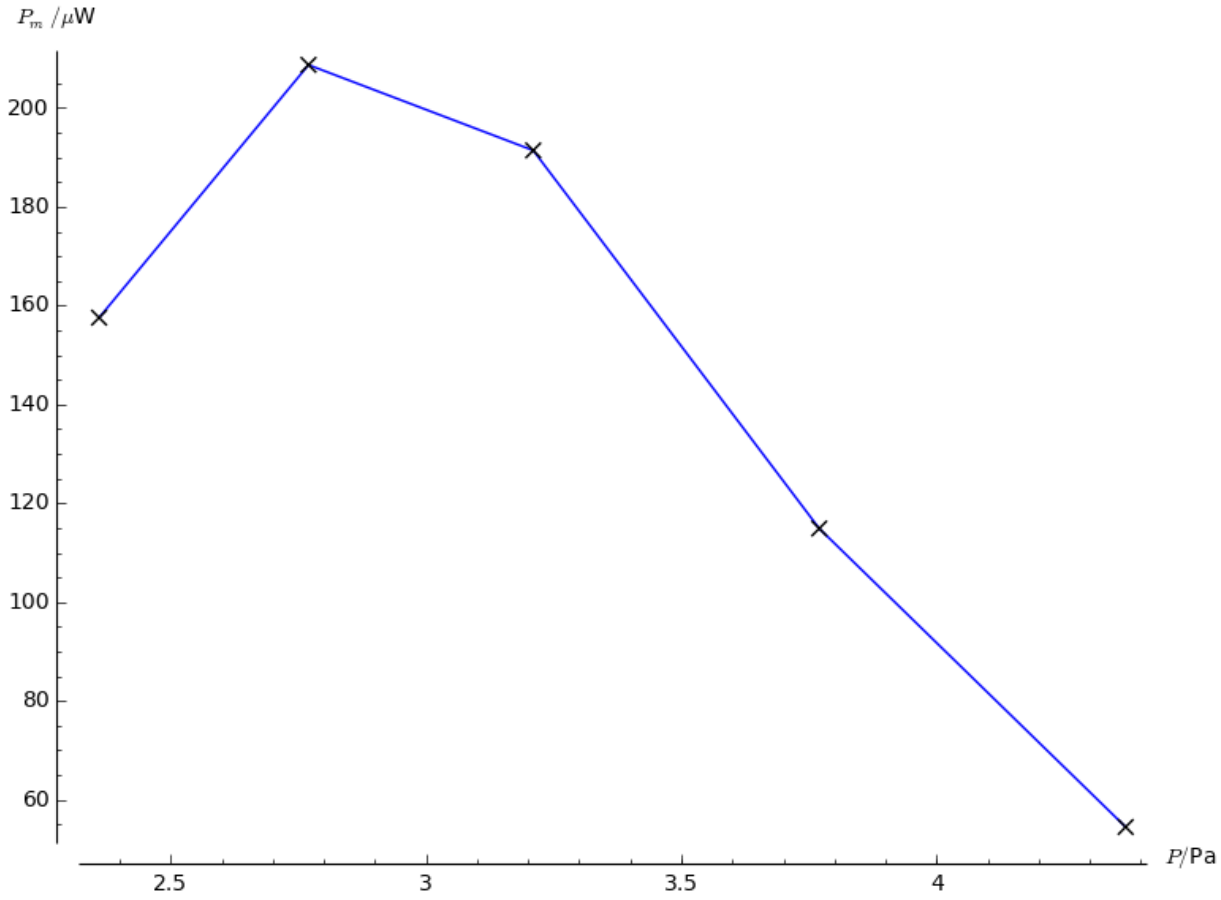
```
    (157.5588800161599, 6.090855840383913)
```

```
Pm =
[54.462864207449904,114.88872145509204,191.4147177646373,208.72450718529544,157.5588800161599]

Im =
[3.4235628022875035,4.0822729920964687,4.8274195035217069,5.8840072338287488,6.090855840383913]

P = [4.37,3.77,3.21,2.77,2.36]
```

```
p1 = line(zip(P,Im)) + scatter_plot(zip(P,Im), marker = "x")
show(p1,axes_labels = ["$P/$Pa","$I_m/$mA"])
```




```
p2 = line(zip(P,Pm)) + scatter_plot(zip(P,Pm), marker = "x")
show(p2,axes_labels = ["$P/$Pa","$P_m/\mu$W"])
```



```
save(p1,axes_labels = ["$P/$Pa","$I_m/$mA"],filename="/usr/tmp/plot1.pdf")
save(p2,axes_labels = ["$P/$Pa","$P_m/\mu$W"],filename="/usr/tmp/plot2.pdf")
```