

Formel 1 :

$$a(x - x_0) + b(y - y_0) + c(z - z_0) = 0$$

Formel 2

$$z_0 = \frac{d - a(x - x_0) - b(y - y_0)}{c}$$

```
% Finner planet basert på 3 koordinattpar  
format longg
```

```
close all; clear all; clc;
```

```
p1 = [25.487 07.706 5.3810 ];% 3 punkt
```

```
p2 = [46.181 02.619 2.3365 ];
```

```
p3 = [42.612 28.593 1.5518 ];
```

```
normal1 = cross(p1 - p2, p1 - p3)% kryssprodukt for å finne normalen
```

```
normal1 = 1×3
```

```
83.0696119
```

```
27.1044023
```

```
519.350453
```

```
d1 = p1(1)*-normal1(1)+p1(2)*-normal1(2)+p1(3)*-normal1(3) %Finner d ved hjelp av formel 1
```

```
d1 =
```

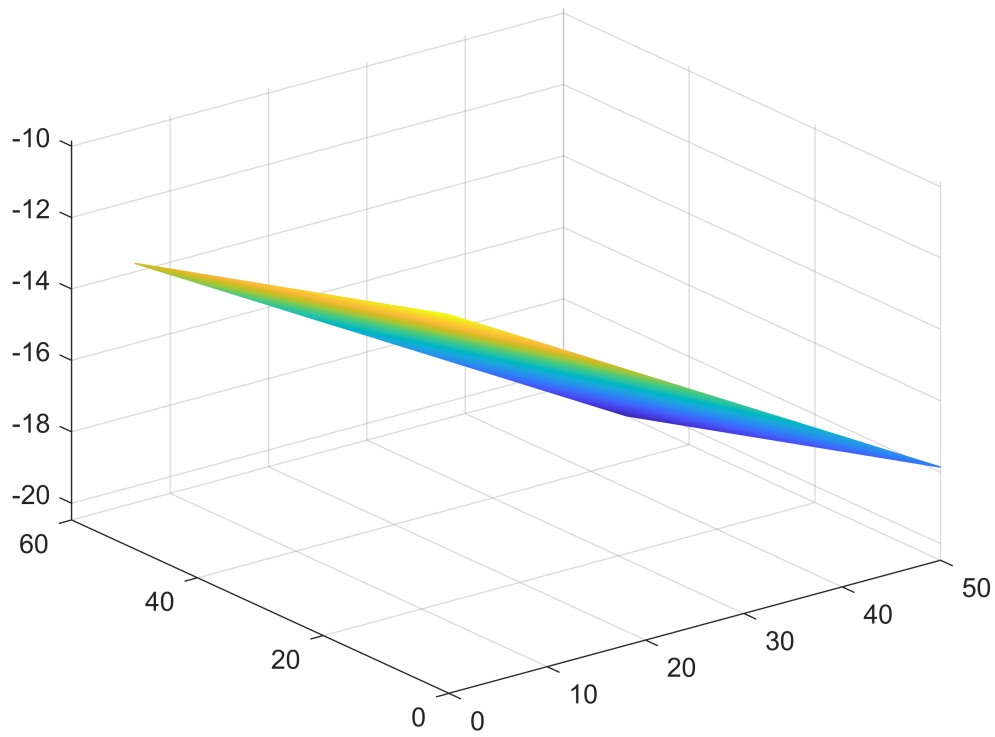
```
-5120.6865102121
```

```
x = 0:50;y = 0:50;
```

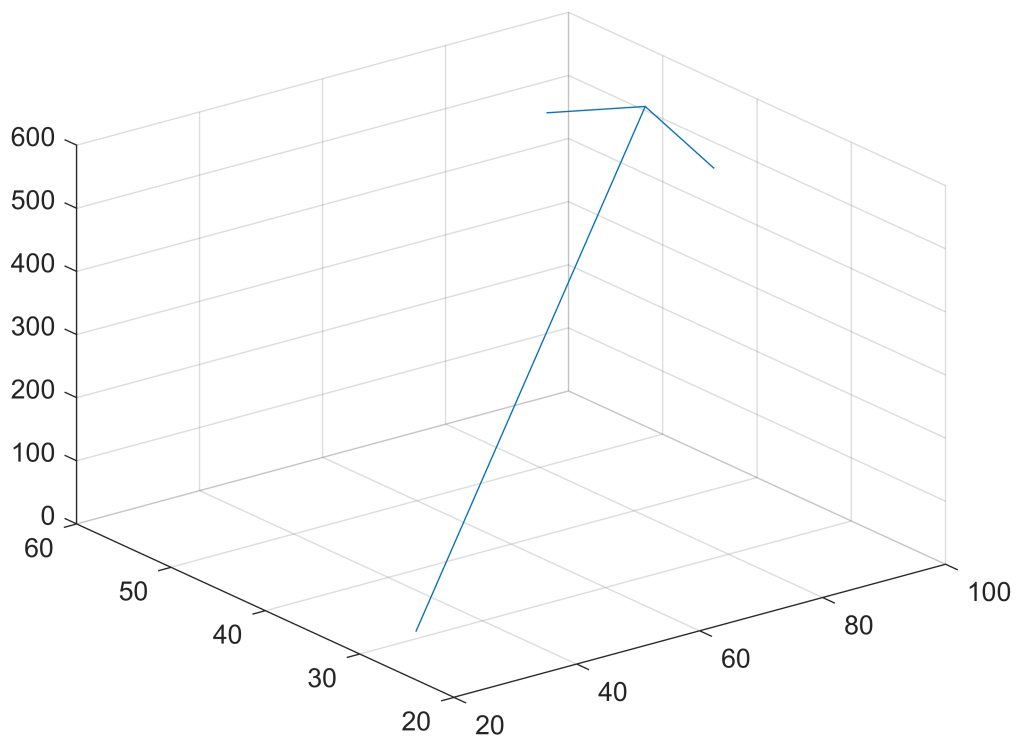
```
[X,Y] = meshgrid(x,y);
```

```
Z = (d1-(normal1(1)*X)-(normal1(2)*Y))/normal1(3);% finner Z koordinat ved formel 2
```

```
mesh(X,Y,Z)
```



```
quiver3(23,26,55,normal1(1),normal1(2),normal1(3))
```



```
Kontroll1 = normal1(1)*-p1(1)+normal1(2)*-p1(2)+normal1(3)*-p1(3)-d1% Kontroll for ligningen ti
```

```
Kontroll1 =  
0
```

```
Norm_e=normal1/norm(normal1)% finner så enhetsvektor
```

```
Norm_e = 1×3  
0.157732136966609      0.0514656948334878      0.986139876094286
```

```
Lign_plan = [Norm_e(1)*p1(1) Norm_e(2)*p1(2) Norm_e(3)*p1(3) ];
```

```
% kontroll
```

```
Kontroll = sum(Norm_e.^2);
```

Litt endringer i koordinater

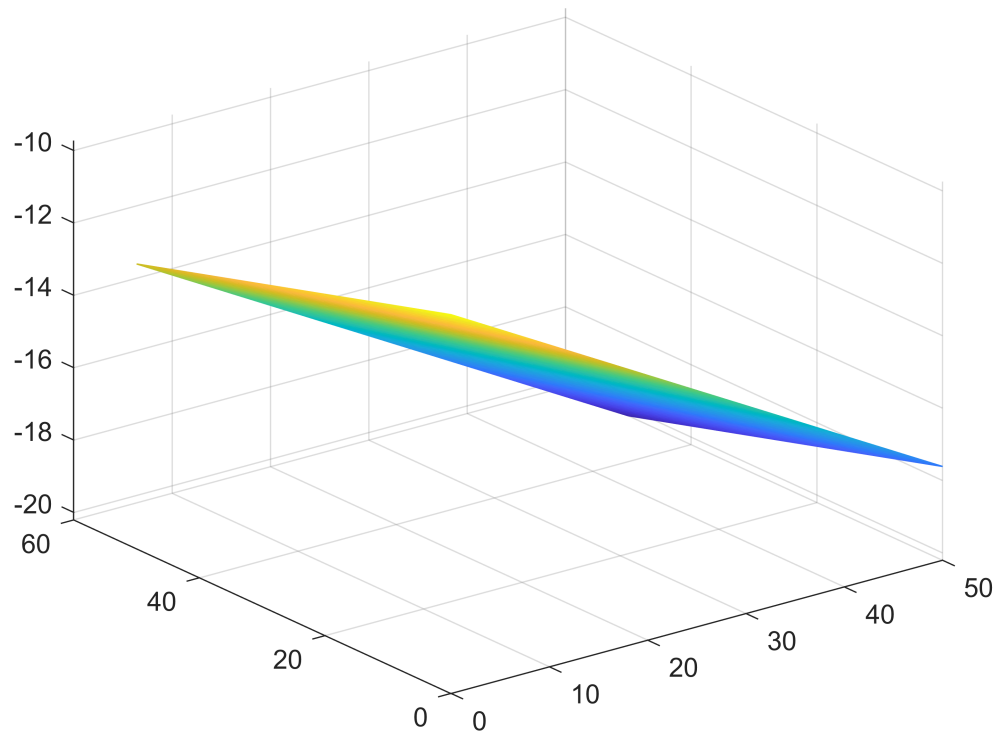
```
% Her kan man endre koordinatene for å se forskjellen i vektor.
```

```
p1_2 = [25.487 07.706 5.3310 ];% 3 punkt, legger inn 5cm endring i z verdien for koordinat 1  
p2_2 = [46.181 02.619 2.3365 ];  
p3_2 = [42.612 28.593 1.5518 ];
```

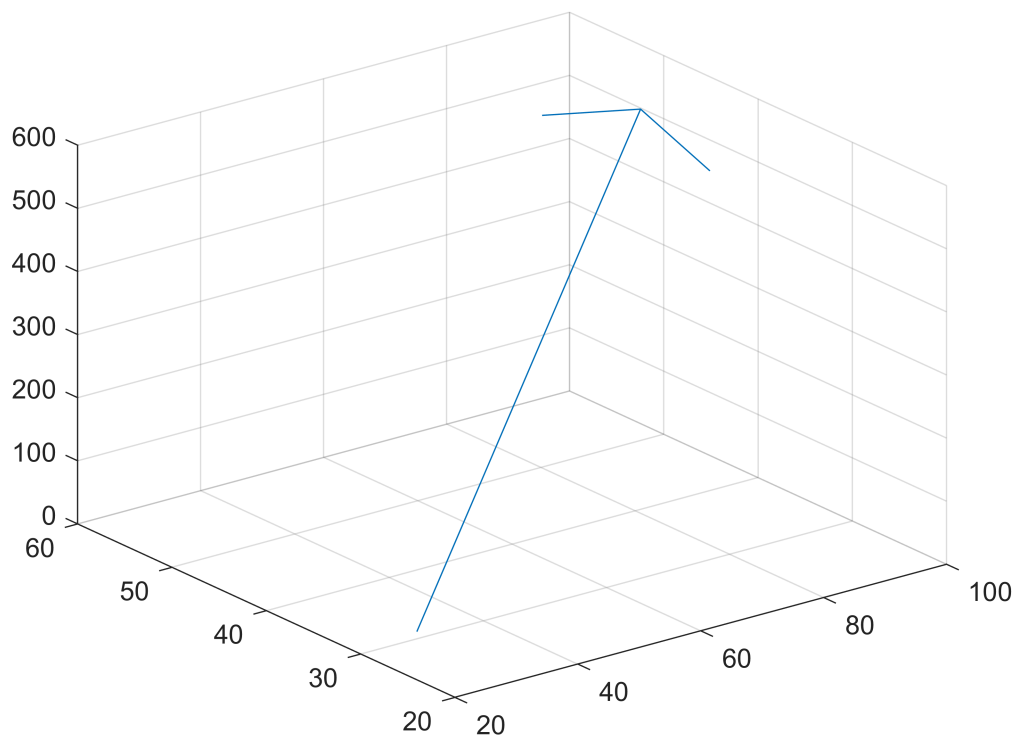
```
normal2 = cross(p1_2 - p2_2, p1_2 - p3_2);% kryssprodukt for å finne normalen  
d2 = p1_2(1)*-normal2(1)+p1_2(2)*-normal2(2)+p1_2(3)*-normal2(3)
```

```
d2 =  
-5060.2438849621
```

```
x = 0:50;y = 0:50;  
[X,Y] = meshgrid(x,y);  
Z = (d2-(normal2(1)*X)-(normal2(2)*Y))/normal2(3);  
mesh(X,Y,Z)
```



```
quiver3(23,26,55,normal2(1),normal2(2),normal2(3))
```



```
%plane_parameters =
```

```
Norm_e2=normal2/norm(normal2)% finner så enhetsvektor
```

```
Norm_e2 = 1×3  
0.155328829477959    0.051147486999449    0.986537829637895
```

```
% kontroll
```

```
Kontroll = sum(Norm_e2.^2);
```

```
diff = Norm_e-Norm_e2% Viser endring i enhetsvektor mellom steg 1 og steg 2.
```

```
diff = 1×3  
0.00240330748865039    0.000318207834038783    -0.000397953543609386
```