

## arco circolare ribassato isostatico: diagrammi delle sollecitazioni

**Ipotesi** : carico uniformemente ripartito, arco ribassato con tre cerniere

### Parametri in gioco:

p: carico uniformemente ripartito, positivo verso il basso

l : metà luce dell'arco

R: raggio dell'arco

f: freccia

alpha: coordinata angolare (alpha=alpha\_0 alla sezione di imposta)

### Obiettivo :

```
> restart;
```

```
with(linalg):
```

```
Warning, the protected names norm and trace have been redefined and unprotected
```

### Azione di contatto

```
> R:=(l^2+f^2)/(2*f):
```

```
alpha_0:=arcsin((R-f)/R):
```

```
x:=l-R*cos(alpha):
```

```
y:=R*sin(alpha)-(R-f):
```

```
eq1:=-T*cos(alpha)+N*sin(alpha)+p*l^2/(2*f):
```

```
eq2:=p*l-p*x+T*sin(alpha)+N*cos(alpha):
```

```
solve({eq1, eq2},{N, T});
```

```
N:=
```

```
1/2*p*(-l^2*sin(alpha)-l^2+l^2*sin(alpha)^2-f^2+f^2*sin(alpha)^2)/f;
```

```
T:=-1/2*p*cos(alpha)*(-l^2+l^2*sin(alpha)+f^2*sin(alpha))/f;
```

```
M:=simplify(p*x^2/2-p*l*x+p*l^2*y/(2*f));
```

$$\{ T = -\frac{1}{2} \frac{p \cos(\alpha) (-l^2 + l^2 \sin(\alpha) + f^2 \sin(\alpha))}{f},$$

$$N = \frac{1}{2} \frac{p (-l^2 \sin(\alpha) - l^2 + l^2 \sin(\alpha)^2 - f^2 + f^2 \sin(\alpha)^2)}{f} \}$$

$$N := \frac{1}{2} \frac{p (-l^2 \sin(\alpha) - l^2 + l^2 \sin(\alpha)^2 - f^2 + f^2 \sin(\alpha)^2)}{f}$$

$$T := -\frac{1}{2} \frac{p \cos(\alpha) (-l^2 + l^2 \sin(\alpha) + f^2 \sin(\alpha))}{f}$$

```
M:=
```

$$\frac{1}{8} \frac{p (-2 l^2 f^2 + \cos(\alpha)^2 l^4 + 2 \cos(\alpha)^2 l^2 f^2 + \cos(\alpha)^2 f^4 + 2 l^4 \sin(\alpha) + 2 l^2 \sin(\alpha) f^2 - 2 l^4)}{f^2}$$

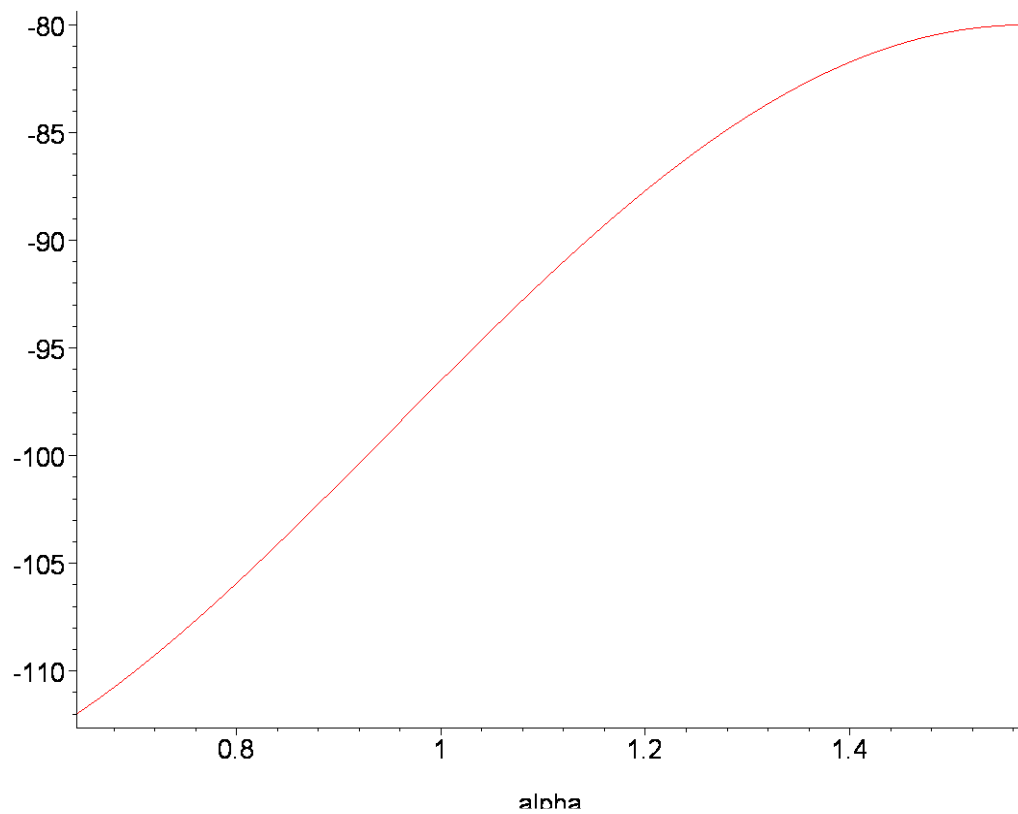
## Valutazione Numerica

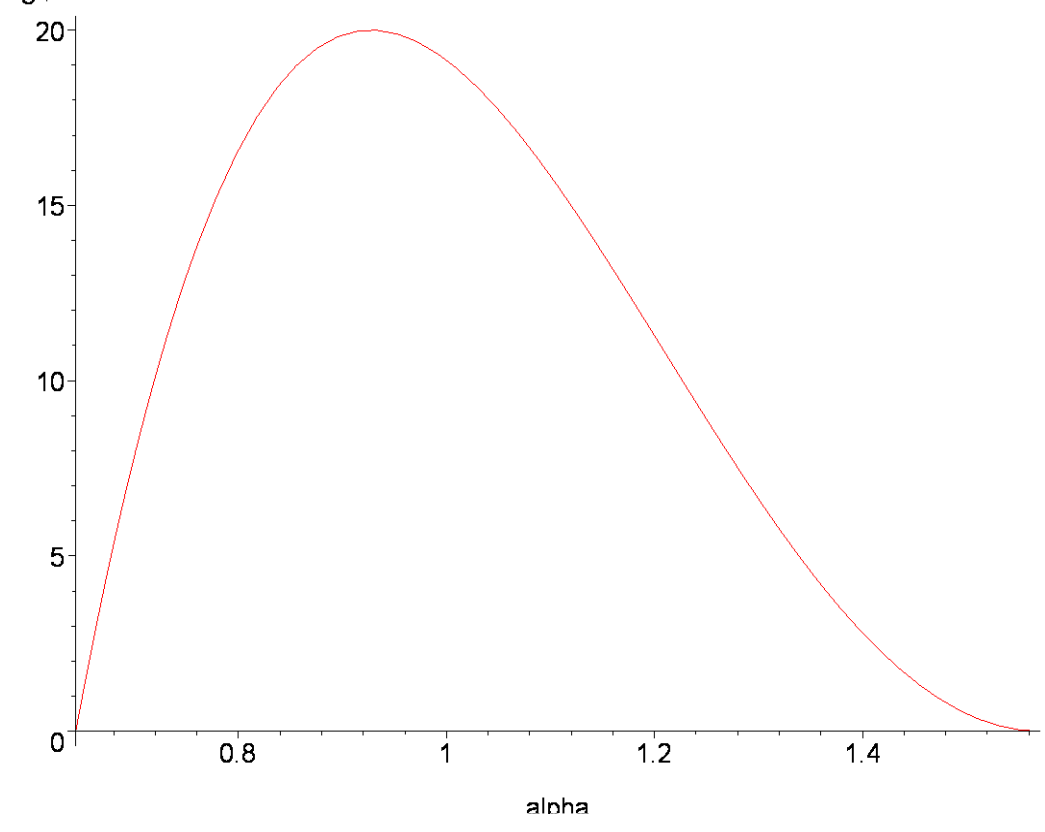
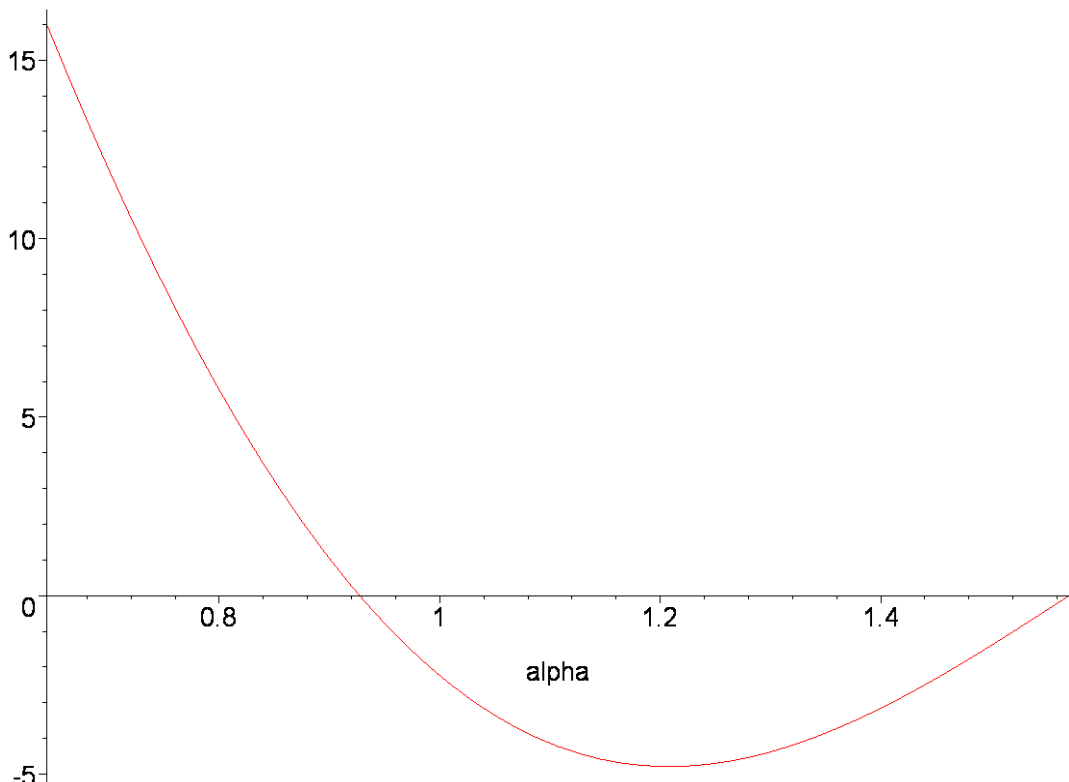
```
> p:=10: l:=8: f:=4:
```

```
> (evalf(R));  
(evalf(alpha_0));
```

```
10.  
.6435011088
```

```
> plot(N, alpha=alpha_0..Pi/2);  
  
plot(T, alpha=alpha_0..Pi/2);  
  
plot(M, alpha=alpha_0..Pi/2);
```





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