Soluzione del telaio secondo il Metodo delle Forze (MdF)

à Dati Numerici

```
Clear@EqD;
```

ü Dati Generali

```
L1 = 400;
L2 = 600;
H = 300;
q = 50;
```

```
F = q H
EIt = 288480 30 50^3 ê 12
EIp = 288480 30 30^3 ê 12
KP = N@2050000 Pi 3^2 ê 4 ê Sqrt@L1^2 + H^2DD
Omega = N@ArcTan@H ê L1DD
```

```
15000
```

```
90150000000
```

```
19472400000
```

```
28981.2
```

```
0.643501
```

ü Asta AD

```
AlphaAD = H ê H3 EIpL
AlphaDA = H ê H3 EIpL
BetaAD = H ê H6 EIpL
BetaDA = BetaAD
GammaAD = 0
GammaDA = 0
```

$\frac{1}{194724000}$

$\frac{1}{194724000}$

$\frac{1}{389448000}$

$\frac{1}{389448000}$

0

0

ü Asta BE

```
AlphaBE = H ê H3 EIpL
AlphaEB = H ê H3 EIpL
BetaBE = H ê H6 EIpL
BetaEB = BetaBE
GammaBE = 0
GammaEB = 0
```

$\frac{1}{194724000}$

$\frac{1}{194724000}$

$\frac{1}{389448000}$

$\frac{1}{389448000}$

0

0

ü Asta CG

```
AlphaCG = H ê H3 EIpL
AlphaGC = H ê H3 EIpL
BetaCG = H ê H6 EIpL
BetaGC = BetaCG
GammaCG = 0
GammaGC = 0
```

$\frac{1}{194724000}$

$\frac{1}{194724000}$

$\frac{1}{389448000}$

$\frac{1}{389448000}$

0

0

ü Asta DE

```
AlphaDE = L1 ê H3 EItL
AlphaED = L1 ê H3 EItL
BetaDE = L1 ê H6 EItL
BetaED = BetaDE
GammaDE = q L1 ^ 3 ê 24 ê EIt
GammaED = −q L1 ^ 3 ê 24 ê EIt
```

$\frac{1}{676125000}$

$\frac{1}{676125000}$

$\frac{1}{1352250000}$

$\frac{1}{1352250000}$

$\frac{8}{5409}$

$-\frac{8}{5409}$

ü Asta EG

```
AlphaEG = L2 ê H3 EItL
AlphaGE = L2 ê H3 EItL
BetaEG = L2 ê H6 EItL
BetaGE = BetaEG
GammaEG = q L2 ^ 3 ê 24 ê EIt
GammaGE = −q L2 ^ 3 ê 24 ê EIt
```

$\frac{1}{4507500000}$

$\frac{1}{4507500000}$

$\frac{1}{9015000000}$

$\frac{1}{9015000000}$

$\frac{3}{601}$

$-\frac{3}{601}$

à Incognite

```
Incognite = 8MAD, MCG, MDA, MED, MEG, MGC, MDE, MEB, MGE, Delta<;
```

à Equazioni

```
Eq = Table@0, 8i, 1, 10<D;
```

ü Equazioni di Congruenza alla rotazione Nodale

```
Eq@@1DD = FiAD;
Eq@@2DD = FiCG;
Eq@@3DD = FiDA − FiDE;
Eq@@4DD = FiED − FiEB;
Eq@@5DD = FiEG − FiEB;
Eq@@6DD = FiGC − FiGE;
```

ü Equazioni di Equilibrio alla rotazione Nodale

```
Eq@@7DD = MDE + MDA;
Eq@@8DD = MED + MEB + MEG;
Eq@@9DD = MGE + MGC;
```

ü Equazioni di Equilibrio Globale alla traslazione

```
Eq@@10DD = −HHMDA + MADL ê H + MEB ê H + HMCG + MGCL ê H + F − XE Cos@OmegaDL;
```

ü Definizione delle rotazioni in funzione dei momenti

```
FiAD = AlphaAD MAD − BetaAD MDA + Delta ê H;
FiDA = AlphaDA MDA − BetaDA MAD + Delta ê H;
FiDE = AlphaDE MDE − BetaDE MED + GammaDE;
FiED = AlphaED MED − BetaED MDE + GammaED;
FiEG = AlphaEG MEG − BetaEG MGE + GammaEG;
FiGE = AlphaGE MGE − BetaGE MEG + GammaGE;
FiEB = AlphaEB MEB + Delta ê H;
FiGC = AlphaGC MGC − BetaGC MCG + Delta ê H;
FiCG = AlphaCG MCG − BetaCG MGC + Delta ê H;
```

ü Relazione tra Spostemeto e Forza del Pendolo

```
XE = KP Delta Cos@OmegaD;
```

à Soluzione del sistema

```
Sol = NSolve@Eq « 0, IncogniteD êê Flatten
```

```
8MAD → −402381., MCG → −680239., MDA → −307052., MED → 1.6211×10^6, MEG → −1.5069×10^6,
 MGC → −862768., MDE → 307052., MEB → −114194., MGE → 862768., Delta → 0.383396<
```