

## TEMAT ĆWICZENIA PROJEKTOWEGO Z PODSTAW STATYKI BUDOWLI

dla studenta/ki..... grupa.....  
(wpisać czytelnie drukowanymi literami imię i nazwisko) (wpisać dzień tygodnia i godzinę zajęć)

### Zadanie 1.

Belkę wieloprzęsłową przegubową rozwiązać analitycznie. Wyznaczyć reakcje i sporządzić wykresy sił przekrojowych. Sprawdzić równowagę wybranego węzła.

\*

$a = 2$  [m],  $b = 3$  [m],  $c = 3$  [m],  $d = 4$  [m],  $e = 3$  [m],  $f = 2$  [m],  $g = 2$  [m],

$\alpha = 30$  [°],  $\beta = 60$  [°],  $\gamma = 60$  [°],  $P_1 = 10$  [kN],  $P_2 = 20$  [kN],  $M = 30$  [kNm],  $q = 8$  [kN/m]

### Zadanie 2.

Układ ramowy rozwiązać analitycznie w zakresie reakcji i sił przekrojowych. Sporządzić wykresy sił przekrojowych. Sprawdzić równowagę wybranego węzła.

\*

$a = 3$  [m],  $b = 4$  [m],  $c = 2$  [m],  $d = 2$  [m],  $e = 3$  [m],  $f = 3$  [m],  $g = 2$  [m],  $h = 2$  [m],

$\alpha = 30$  [°],  $\beta = 60$  [°],  $P_1 = 10$  [kN],  $P_2 = 20$  [kN],  $M = 45$  [kNm],  $q = 6$  [kN/m]

### Zadanie 3.

W kratownicy wyznaczyć:

- reakcje metodą analityczną,
- siły we wszystkich prętach: metodą kolejnego równoważenia węzłów w wersji analitycznej.
- siły w wybranych 3. prętach analitycznie: metodą przecięć (Rittera), w razie potrzeby skojarzoną z metodą równoważenia węzłów.

\*

$a = \dots$  [m],  $b = \dots$  [m],  $c = \dots$  [m],  $d = \dots$  [m],  $e = \dots$  [m],  $f = \dots$  [m],  $g = \dots$  [m],

$\alpha = 30$  [°],  $\beta = 60$  [°],  $P_1 = 10$  [kN],  $P_2 = 15$  [kN],  $P_3 = 20$  [kN]

### Zadanie 4.

Wyznaczyć wskazane wielkości statyczne (w belce, ramie, kratownicy) wykorzystując zasadę prac przygotowanych. Sporządzić stosowne plany przesunięć.

W belce:  $R$ ,  $M_\alpha$  lub  $T_{\alpha,}$ ; w ramie  $R$ ,  $M_\alpha$  lub  $T_\alpha$  lub  $N_{\alpha,}$ ; w kratownicy  $N_\alpha$  - należy wybrać niezerowe wielkości statyczne.

### Uwaga:

Rozwiązanie każdego z wymienionych zadań musi zawierać sprawdzenie statycznej wyznaczalności i uzasadnienie geometrycznej niezmienności schematów statycznych (warunek ilościowy i jakościowy GN).

Temat wydano: .....

Prowadzący: dr inż. Krzysztof Majcher

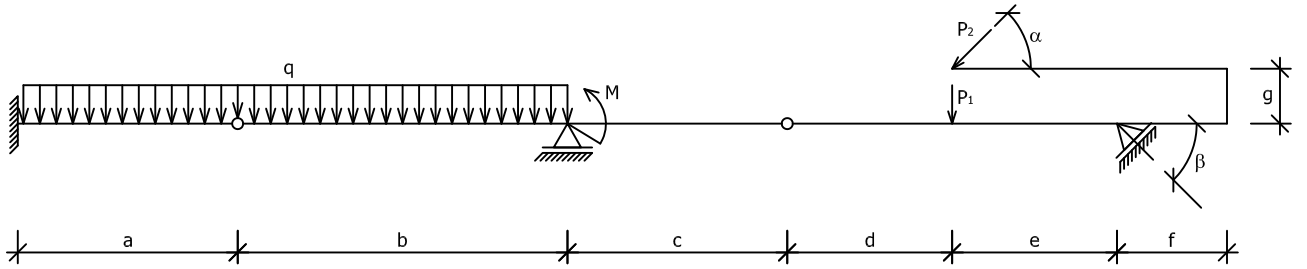
Termin oddania ćwiczenia: .....

Podpis prowadzącego: .....

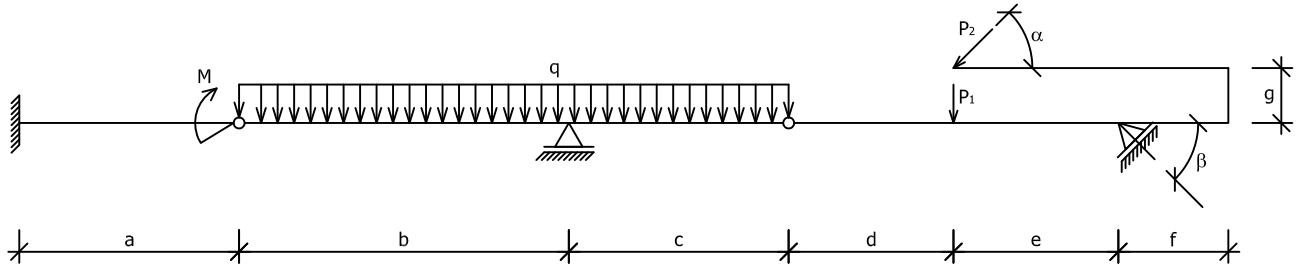
Numer albumu przypisany jest do tematu zgodnie z poniższą tabelą.

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5	271608	42	278008
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7	265137	44	277971
8	278095	45	282845
9	278159	46	277999
10	282112	47	278080
11	278163	48	271462
12	265032	49	274350
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14	278253	51	277947
15	265240	52	260145
16	277869	53	278264
17	282830	54	277934
18	271583	55	277979
19	278052	56	282080
20	277887	57	277965
21	278058	58	278010
22	278261	59	278000
23	278087	60	278034
24	277914	61	271719
25	278101	62	277840
26	277825	63	278069
27	278103	64	276292
28	278097	65	277957
29	277833	66	277845
30	278070	67	278100
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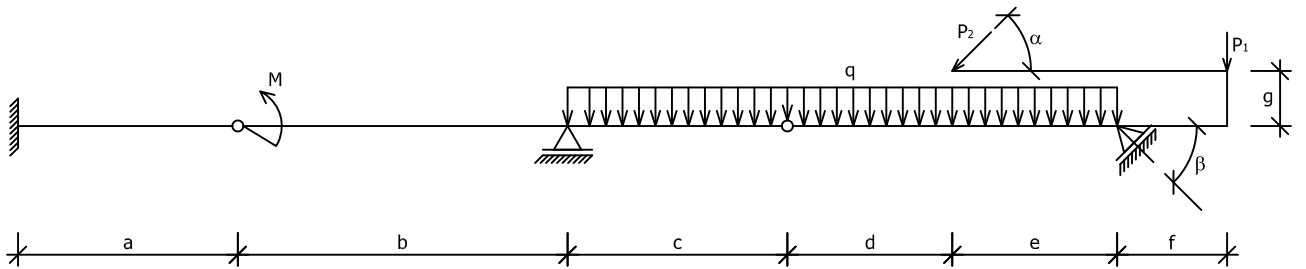
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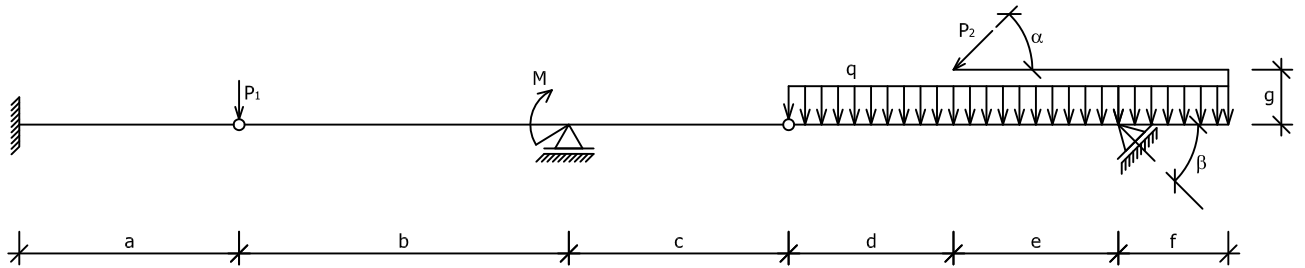
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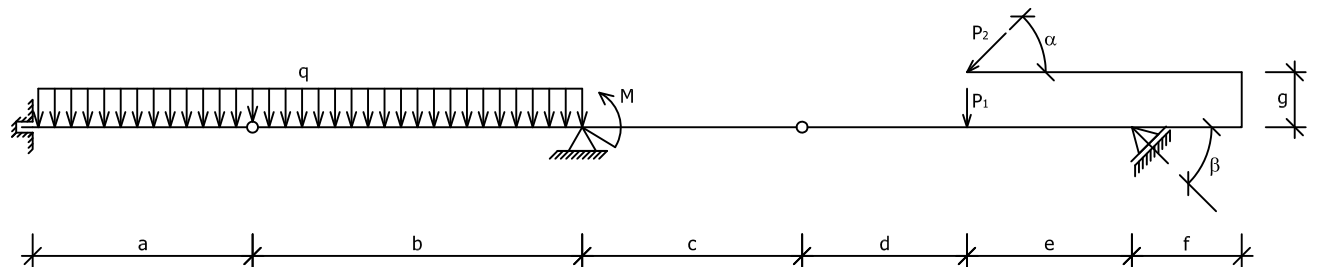
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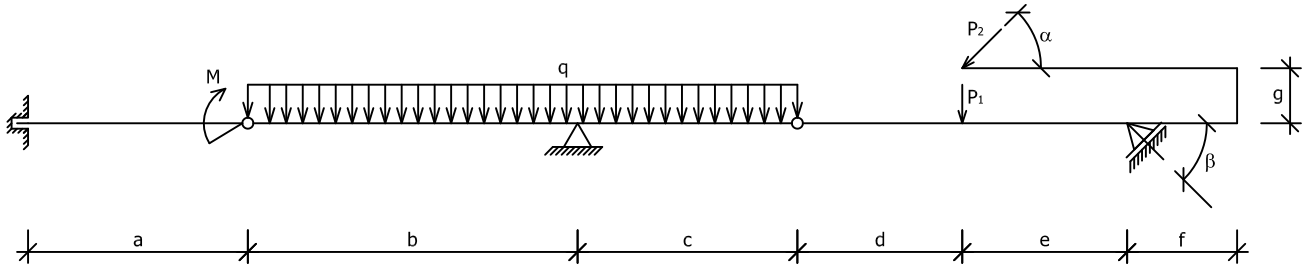
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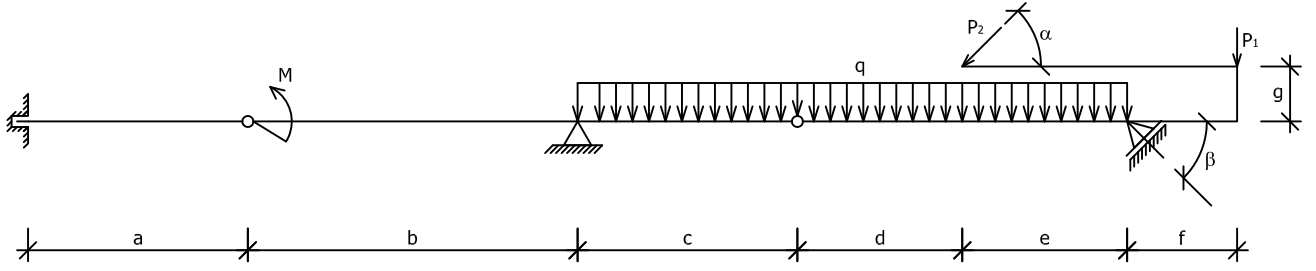
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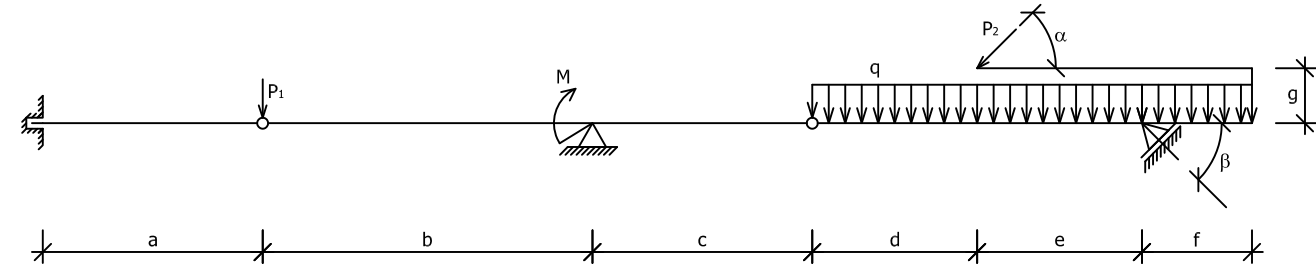
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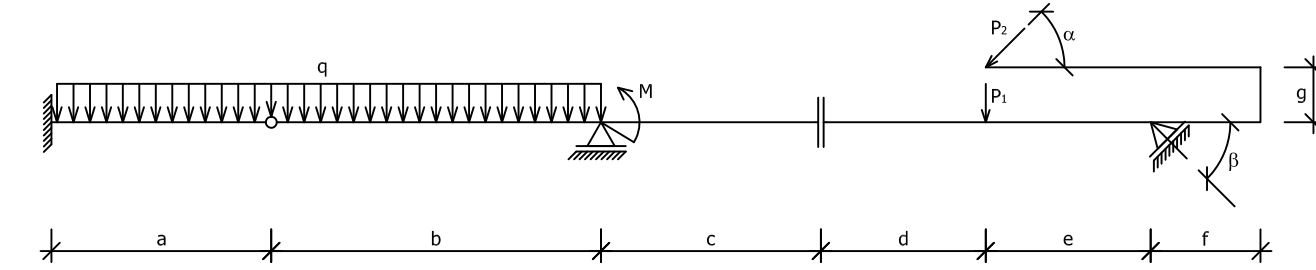
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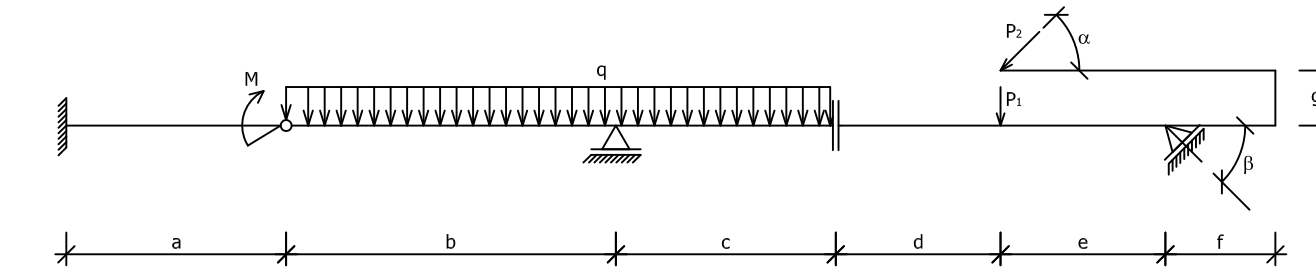
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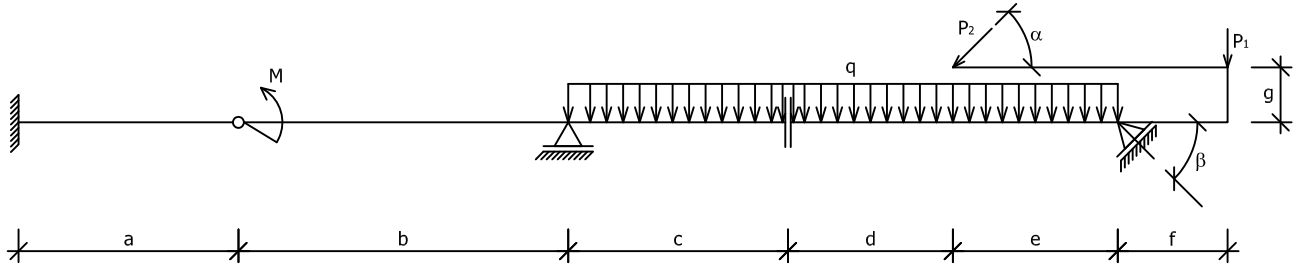
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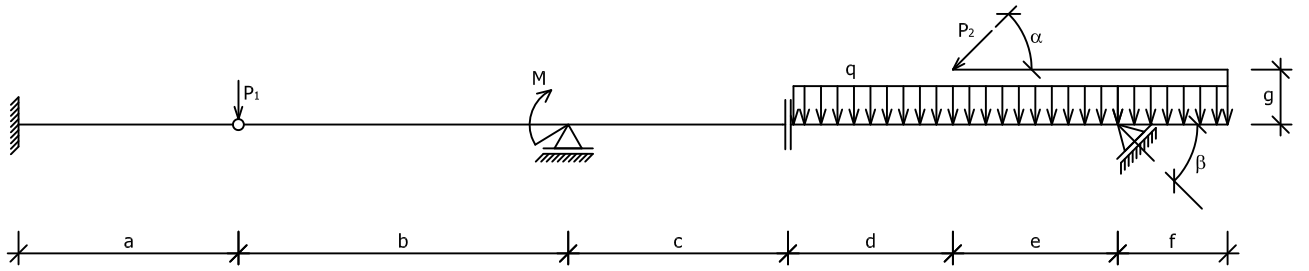
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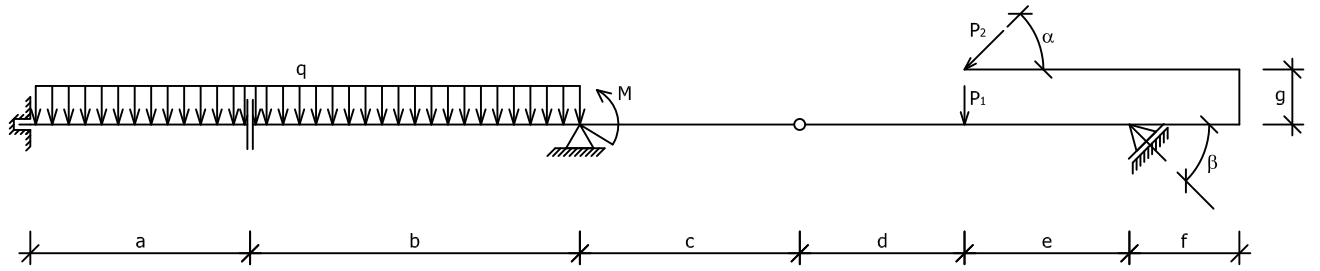
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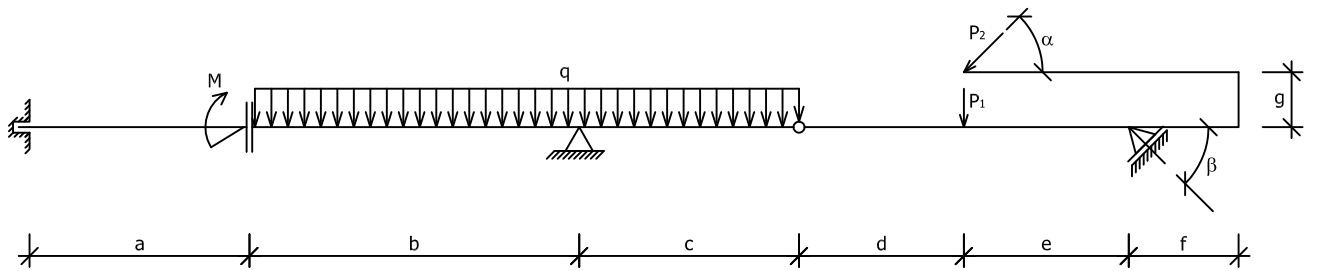
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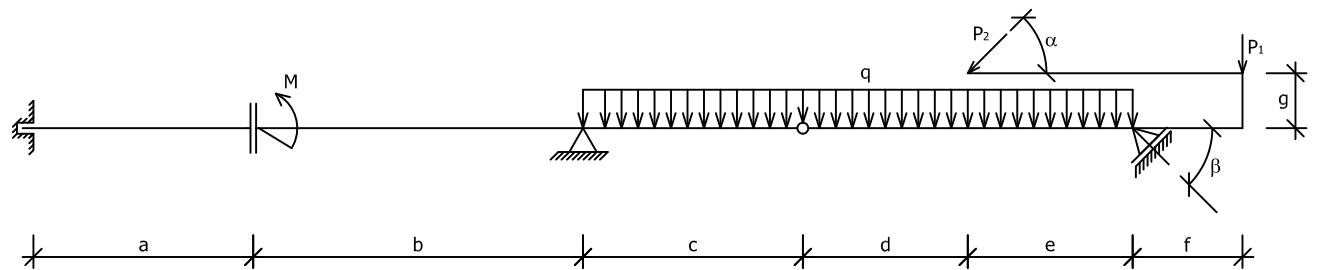
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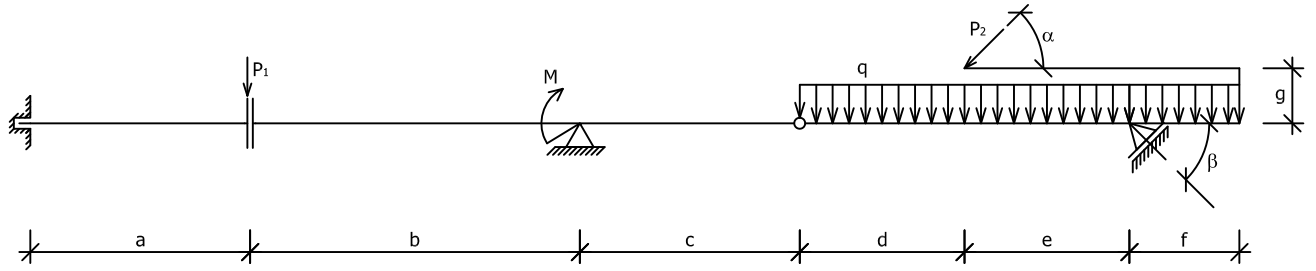
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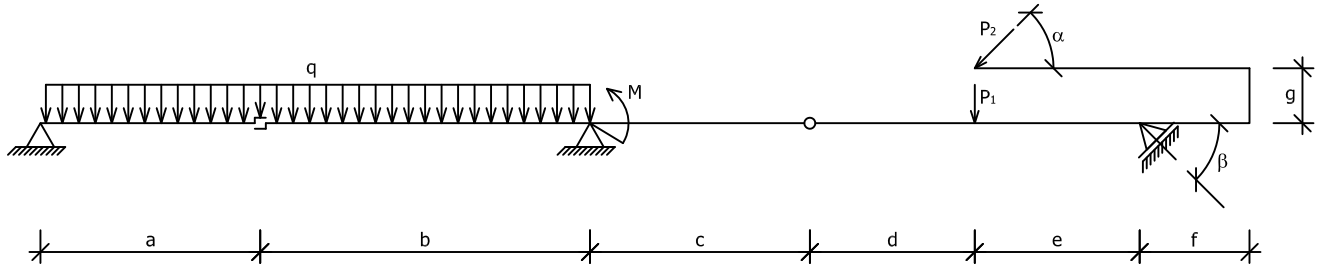
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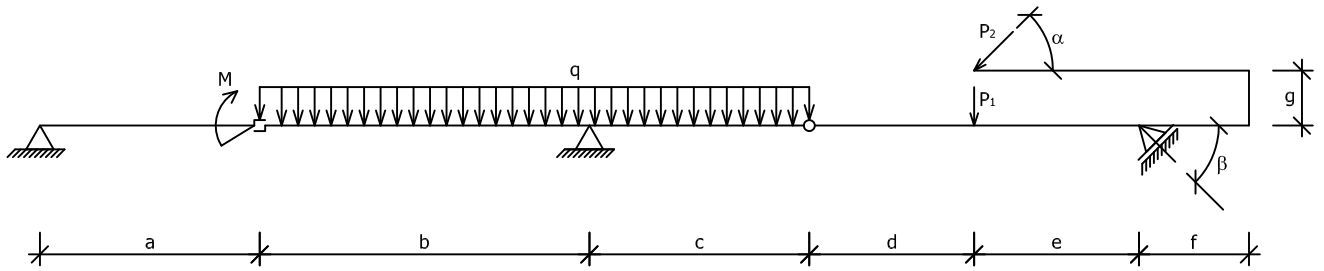
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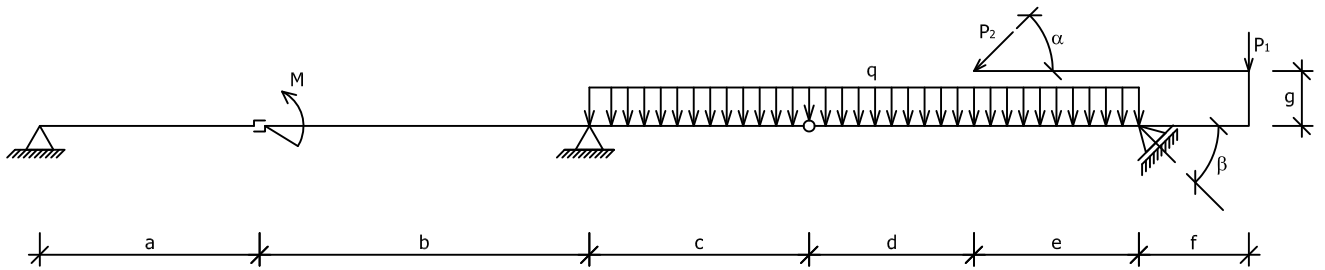
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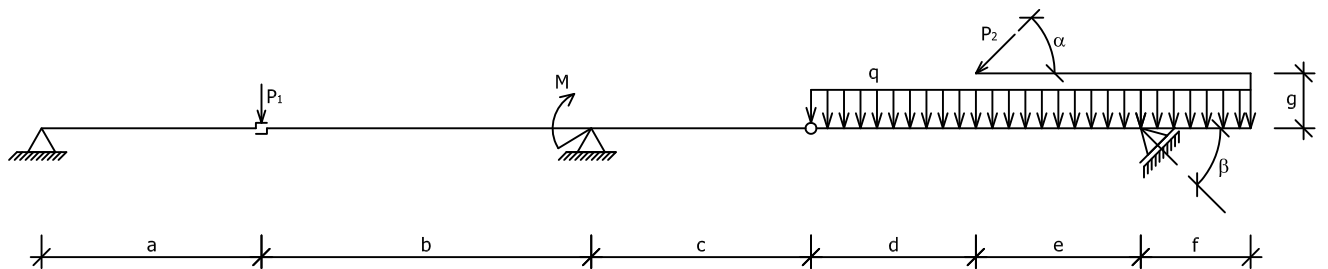
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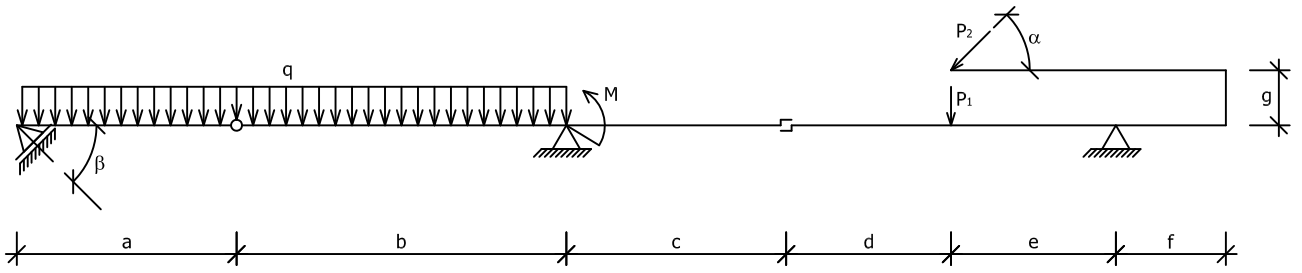
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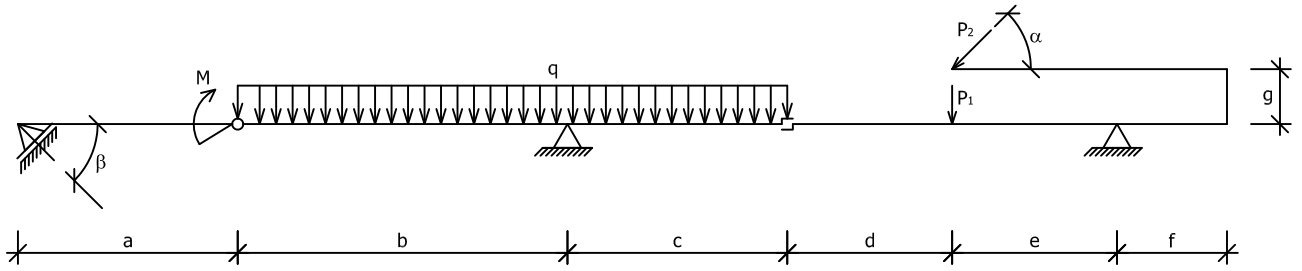
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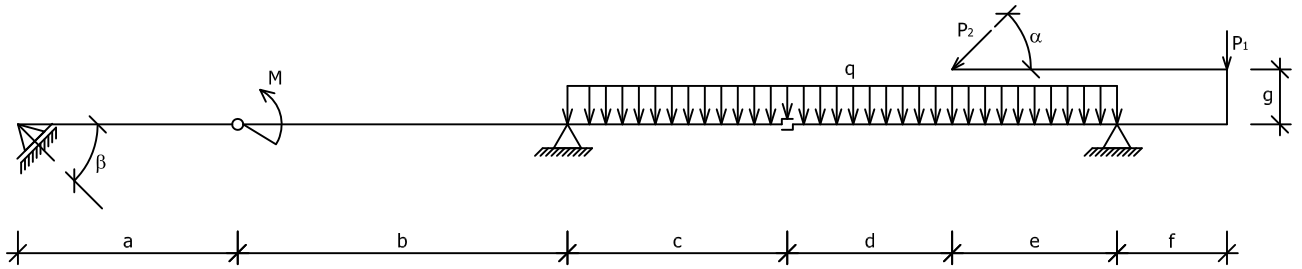
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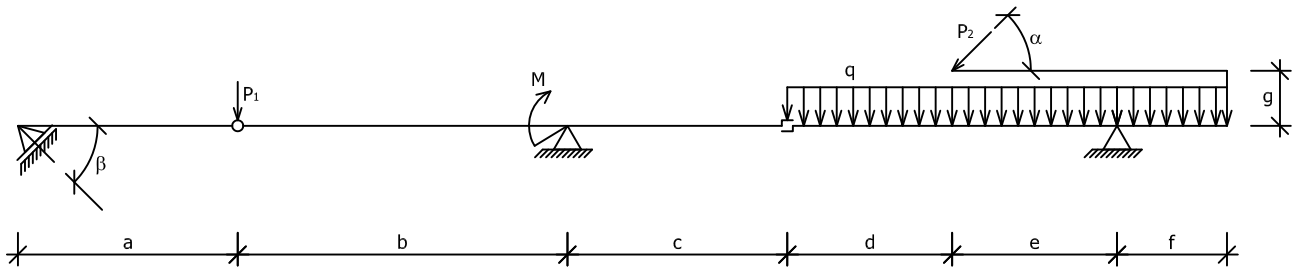
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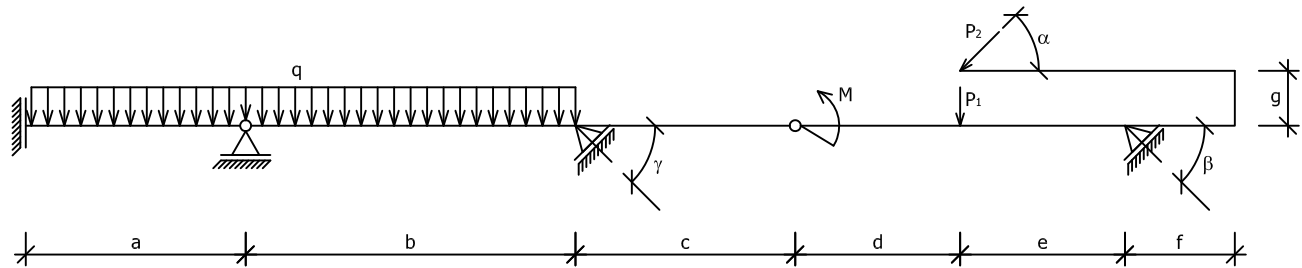
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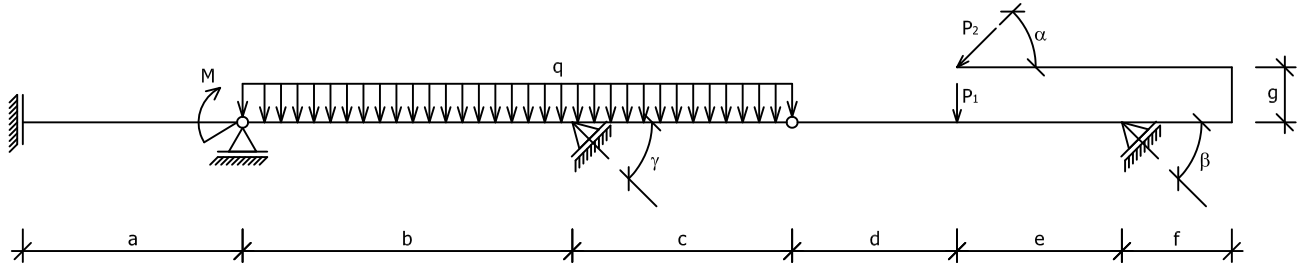
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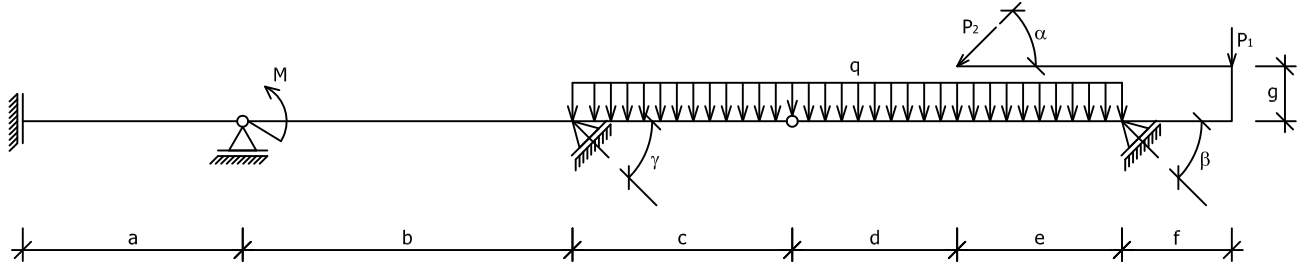
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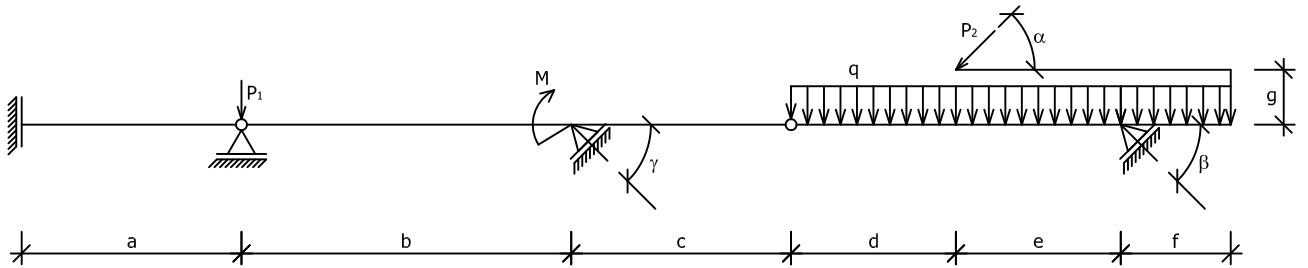
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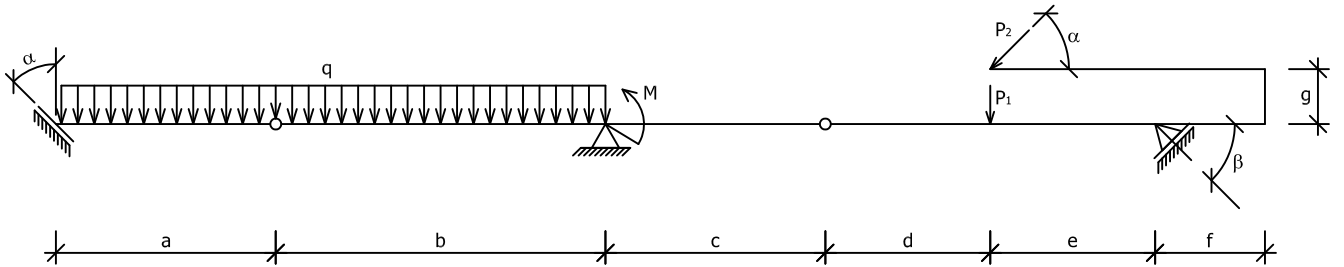
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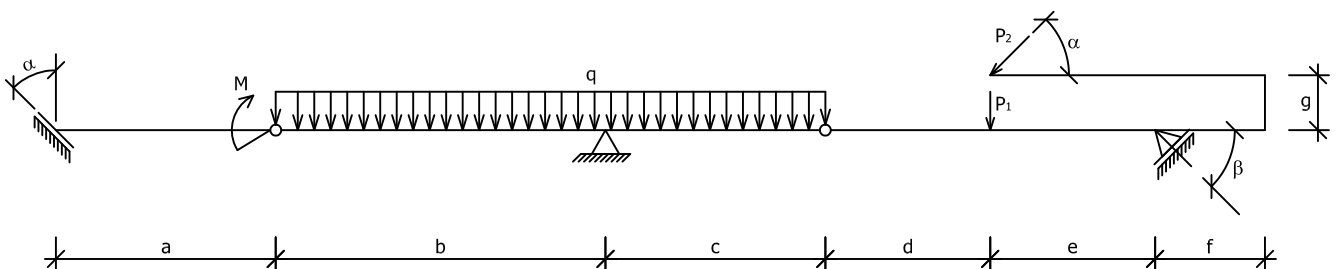
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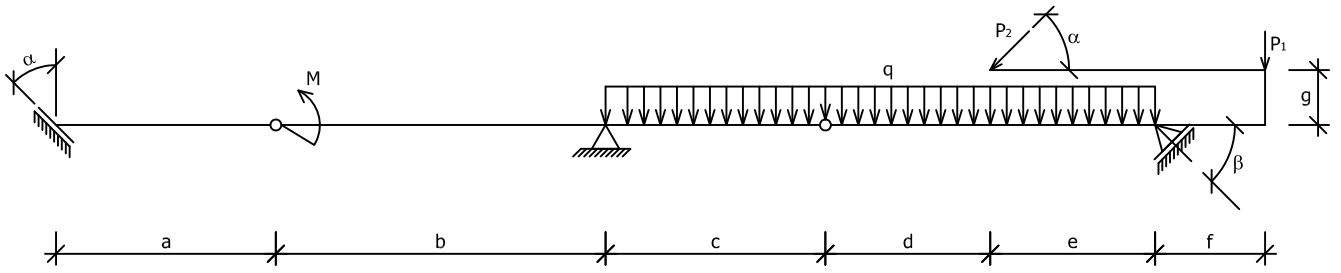


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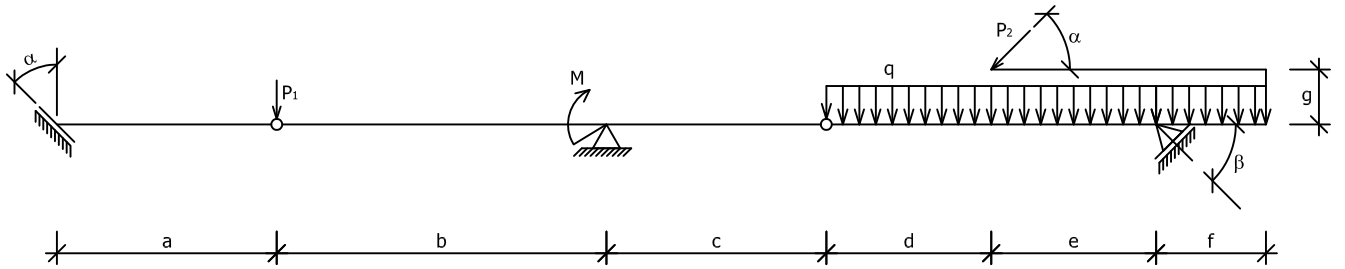




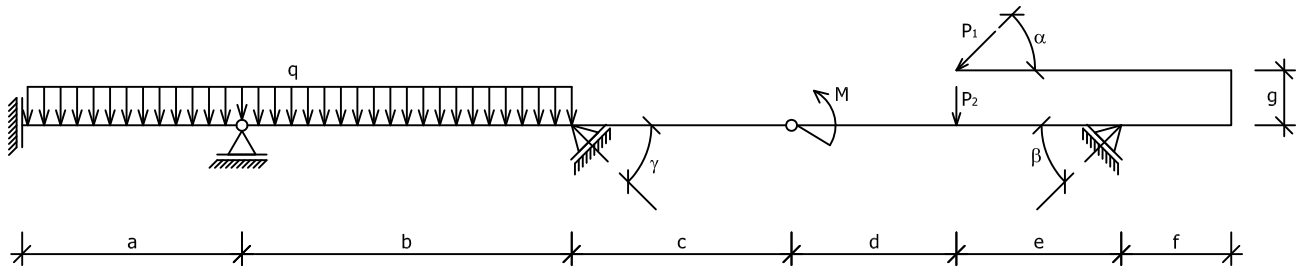
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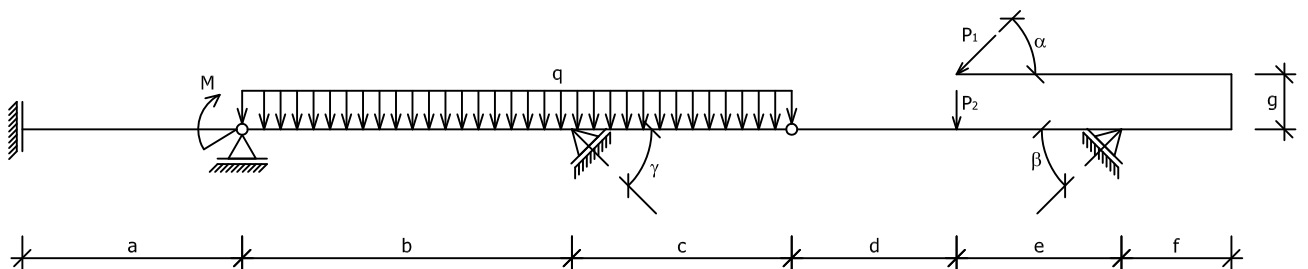
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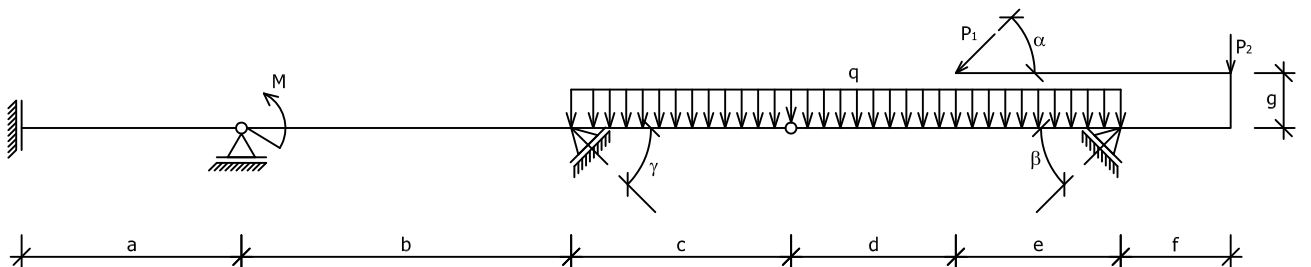
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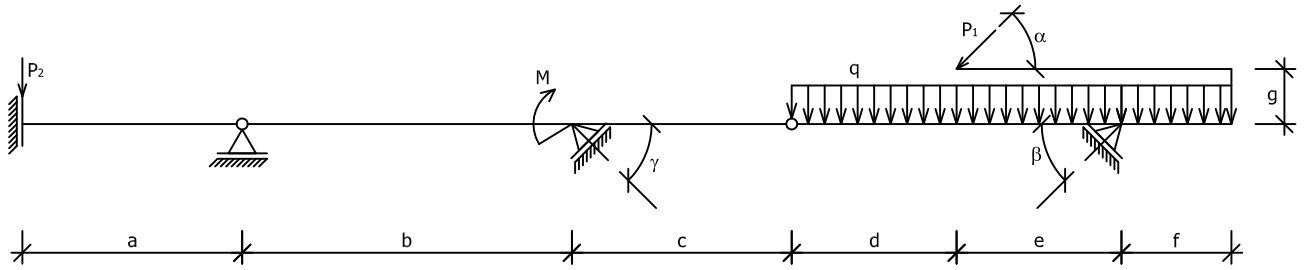
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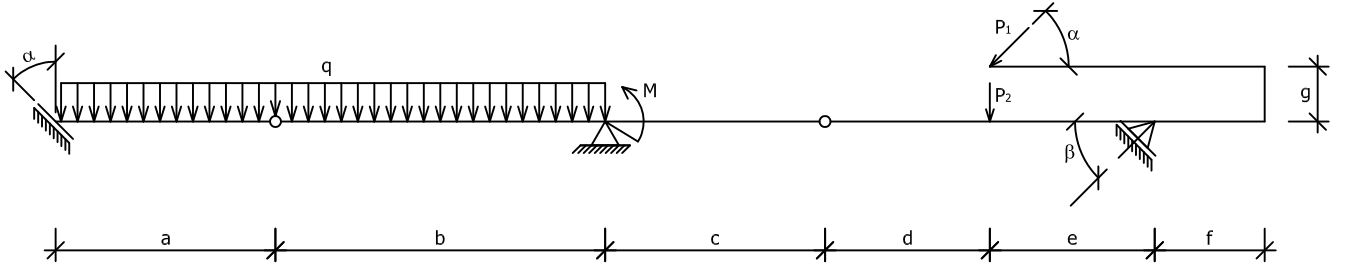
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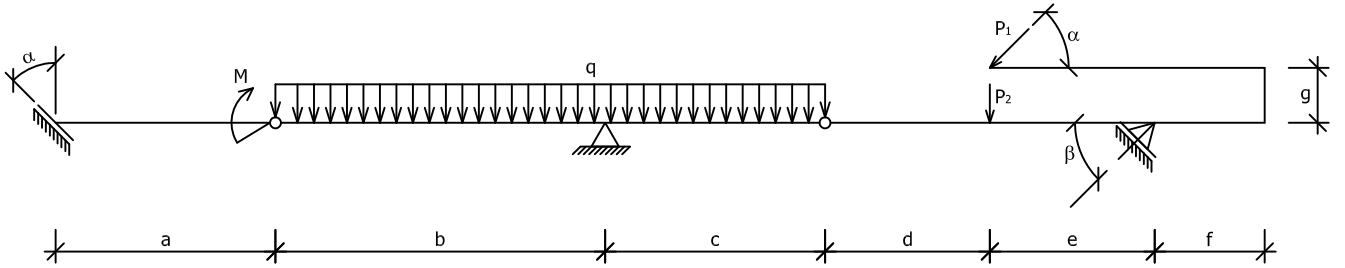
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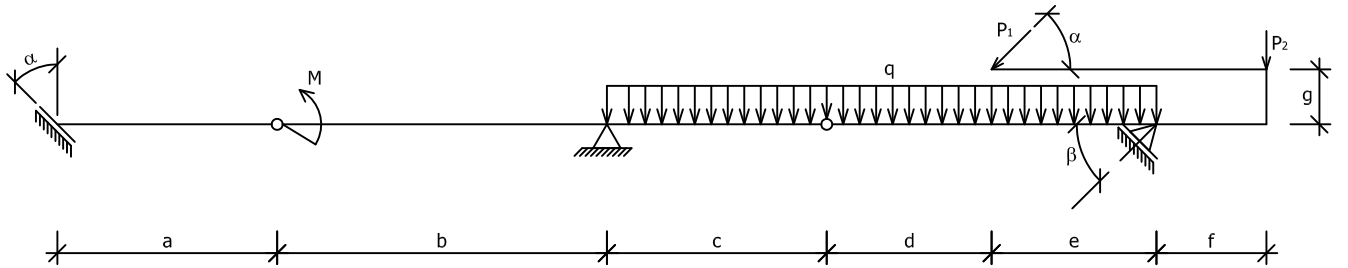
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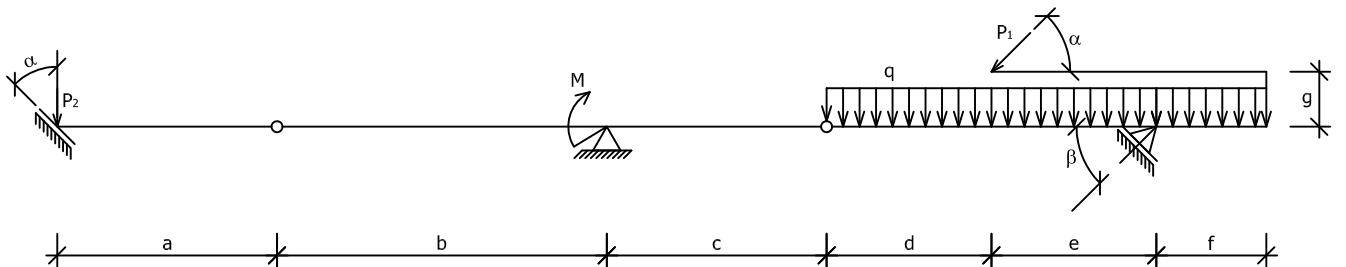
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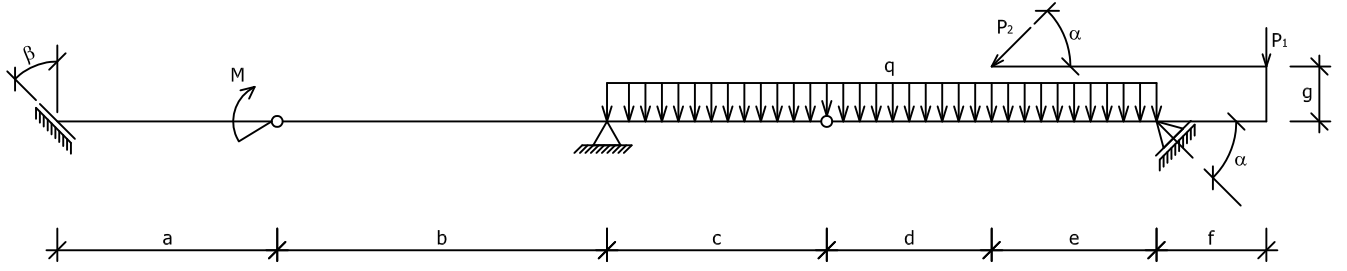
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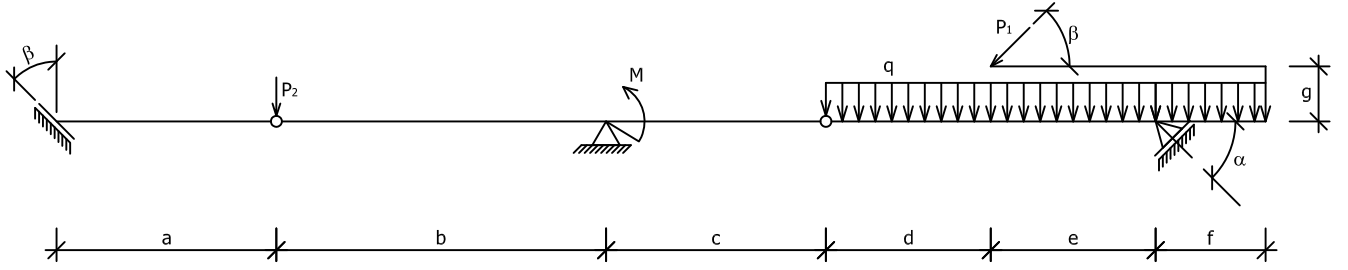
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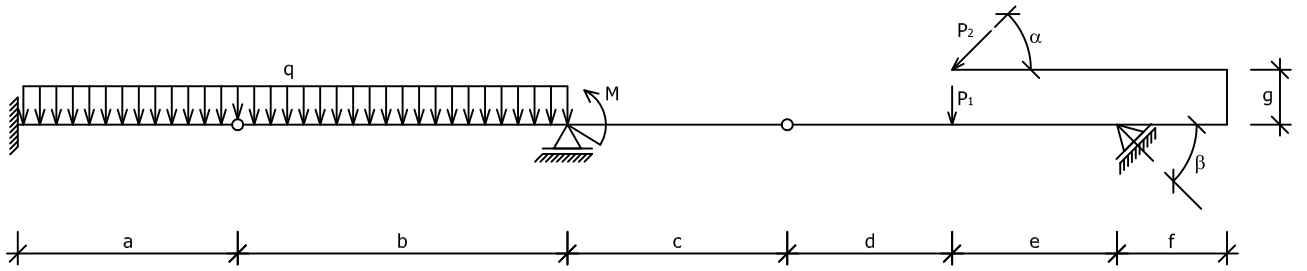
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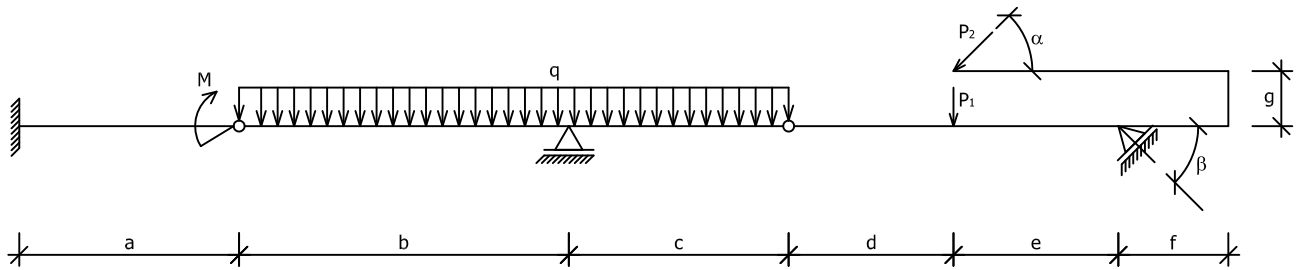
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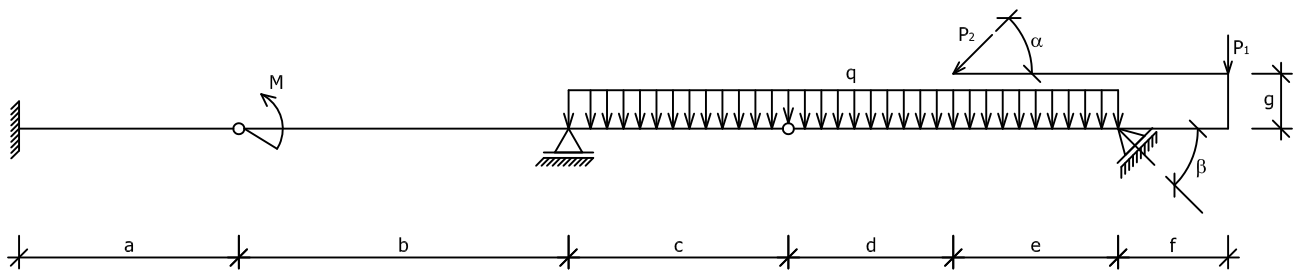
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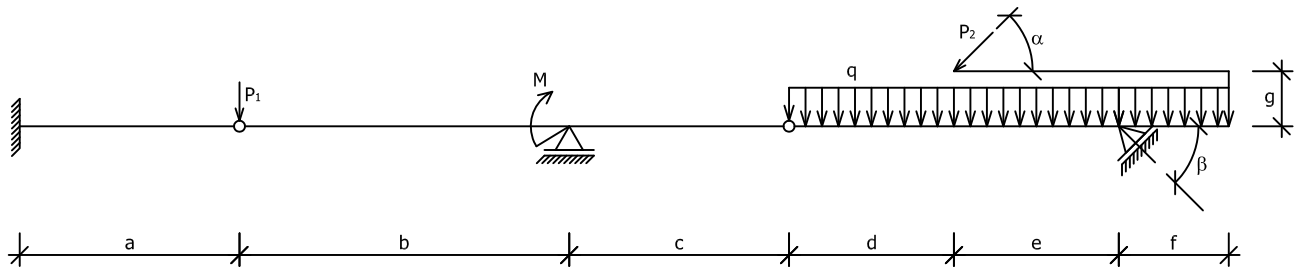
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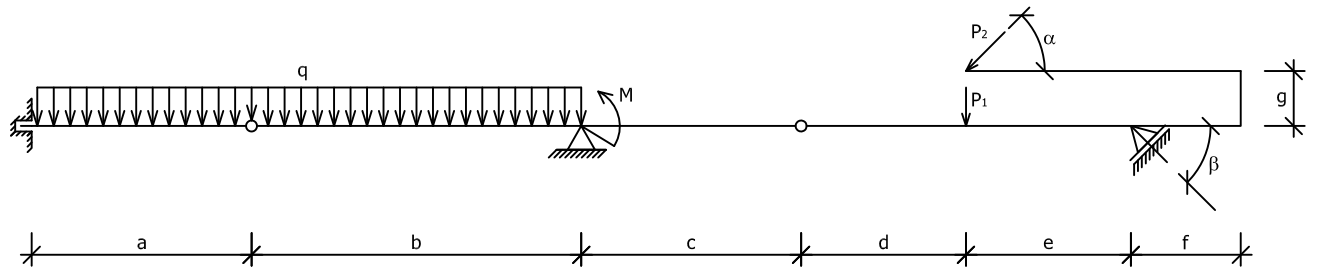
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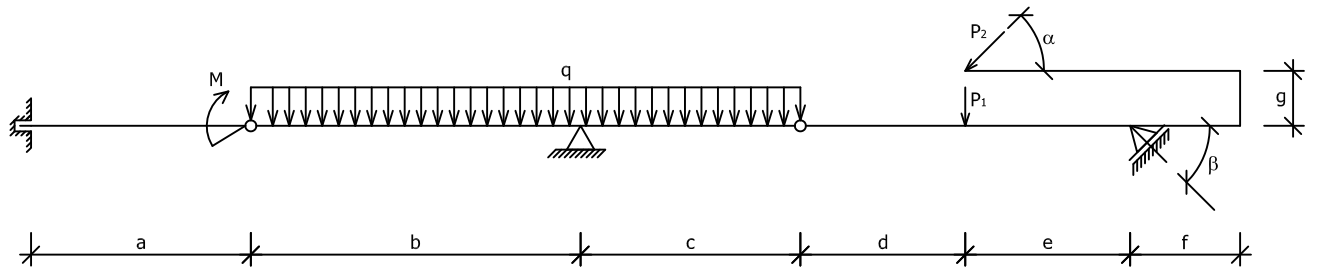
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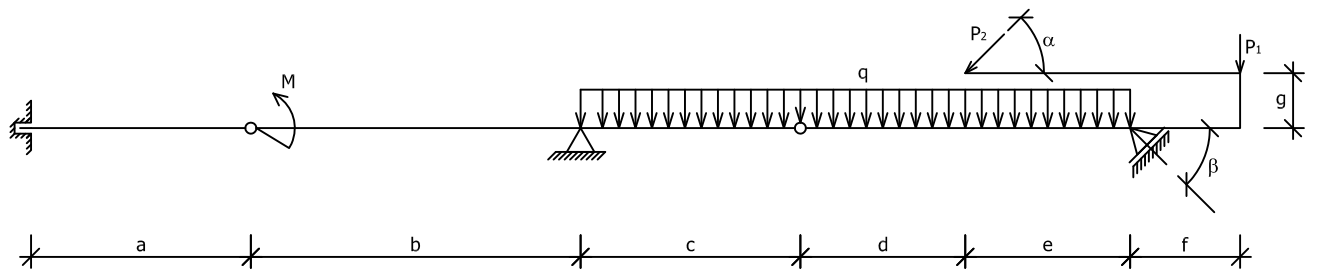
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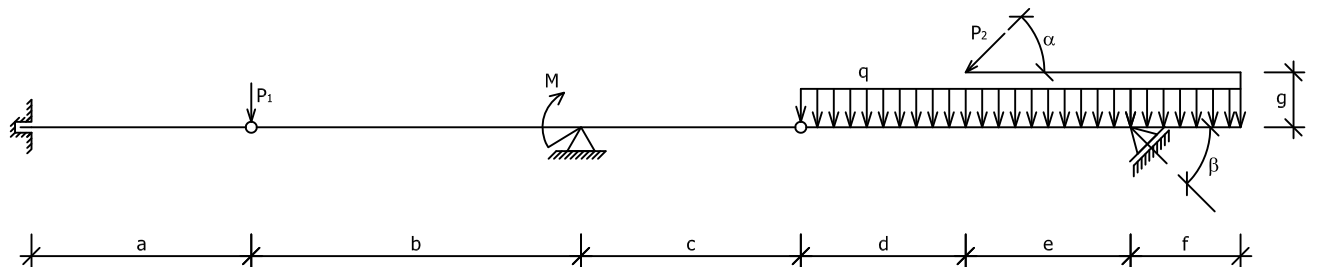
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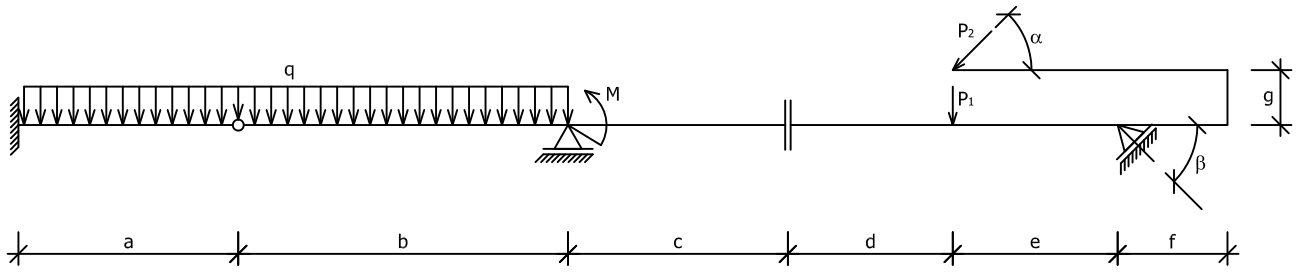
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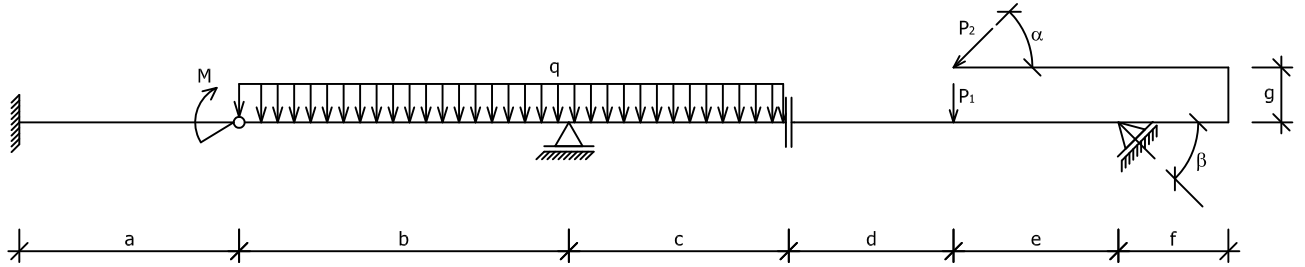
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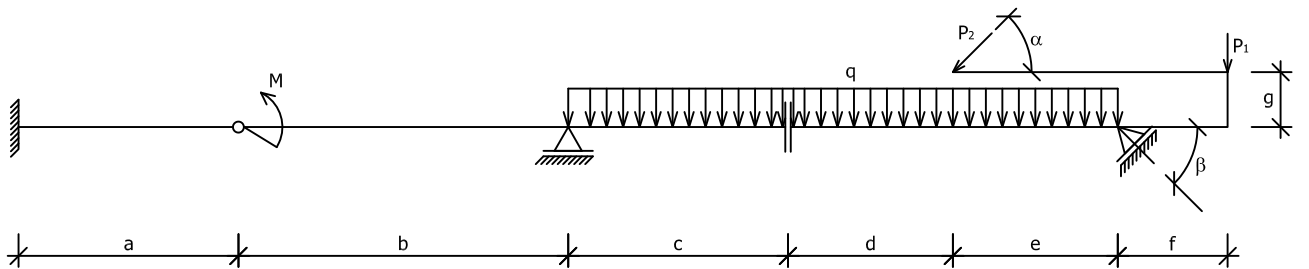
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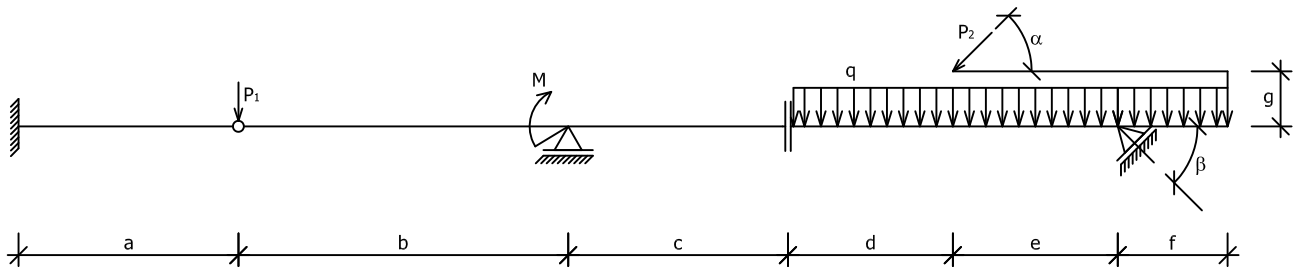
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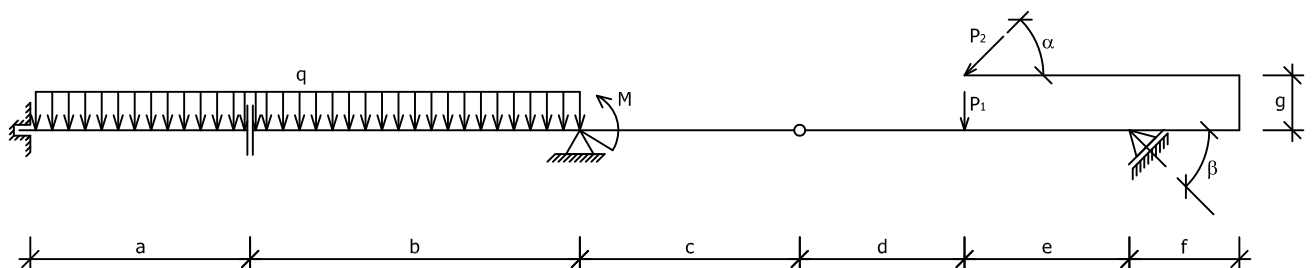
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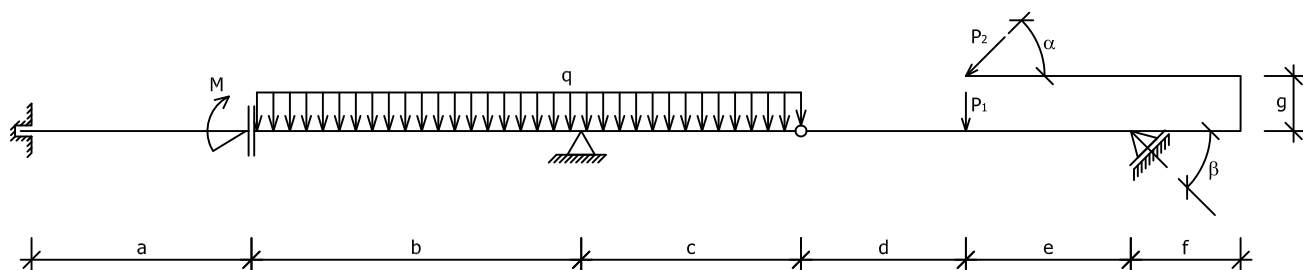
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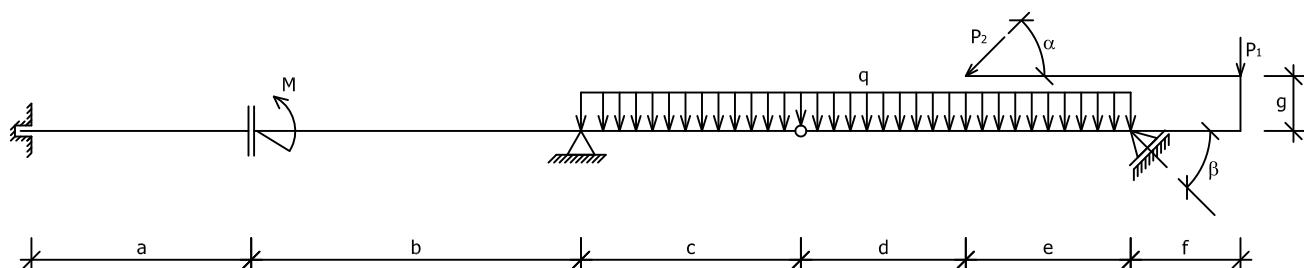
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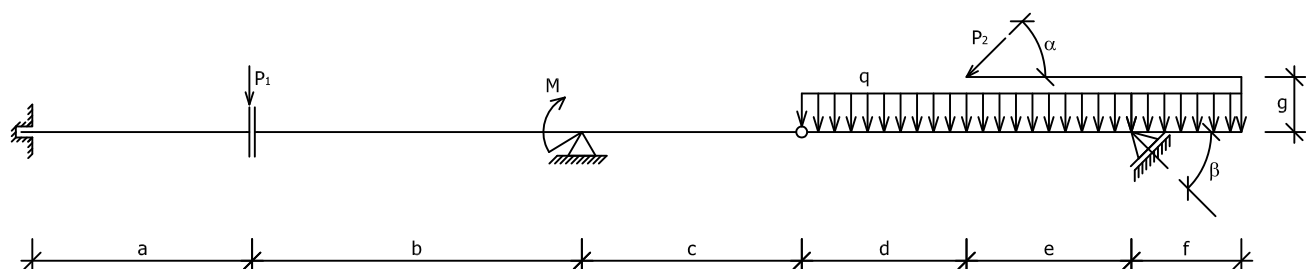
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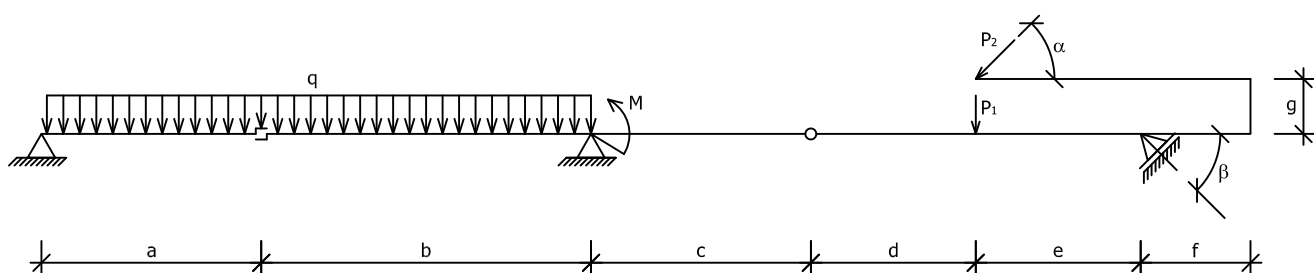
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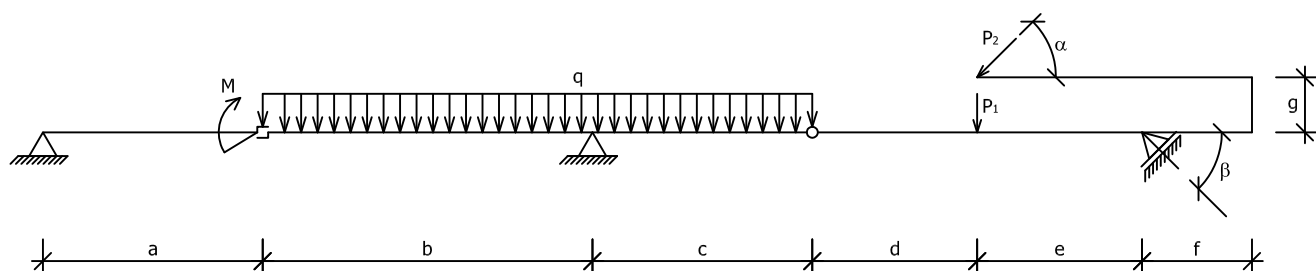
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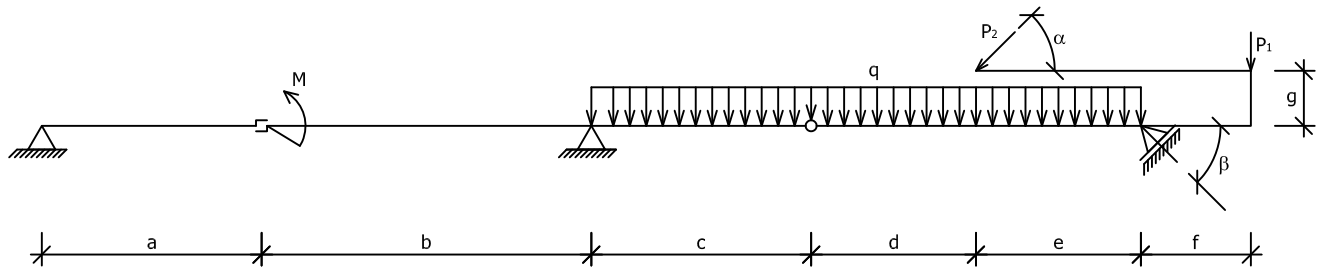
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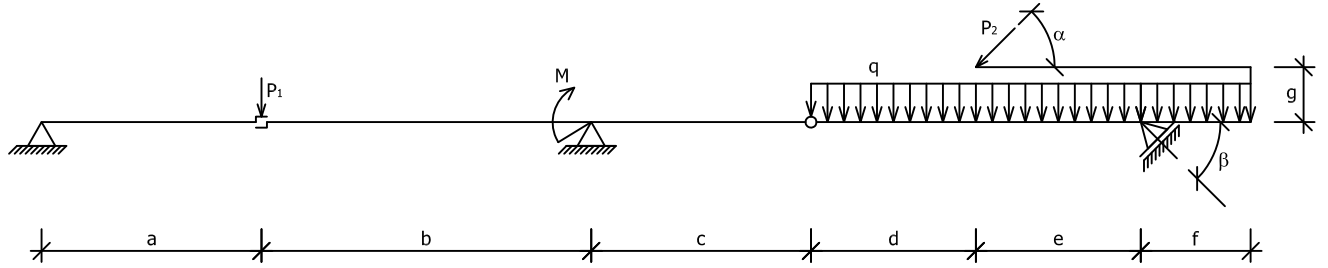
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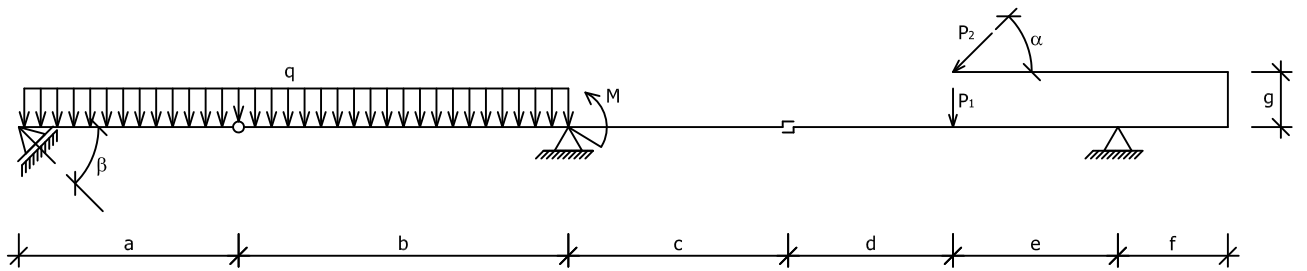
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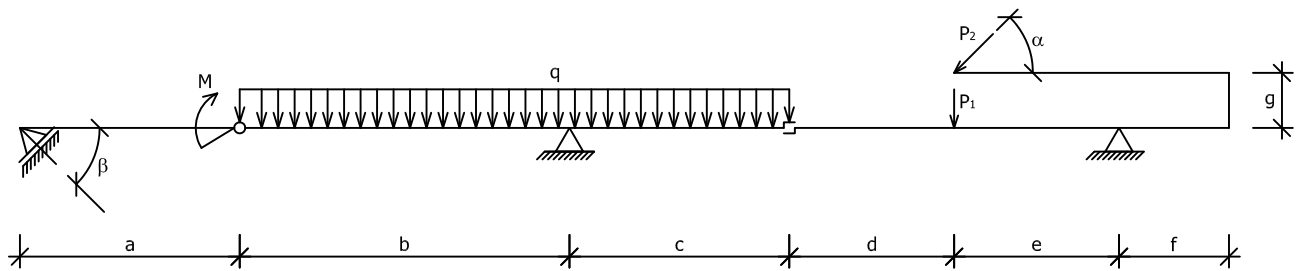
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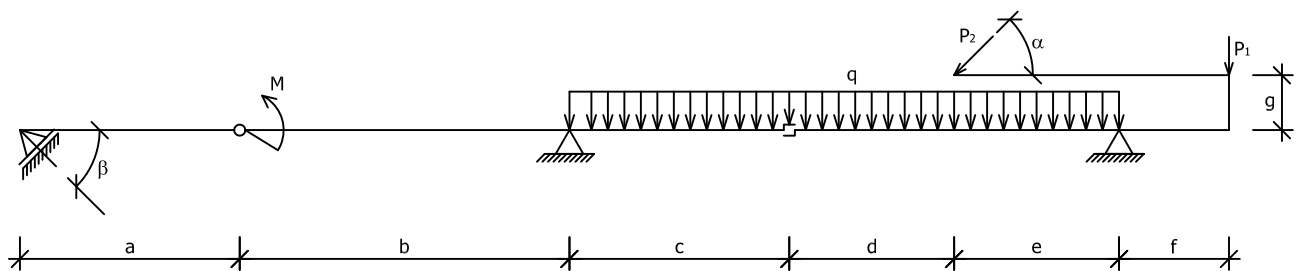
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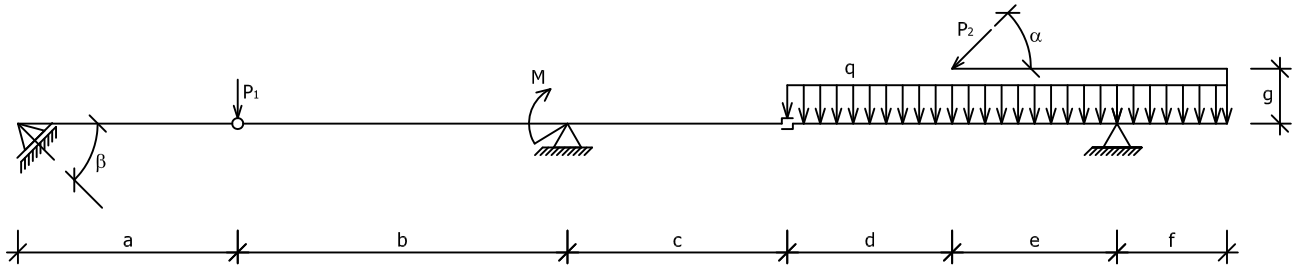
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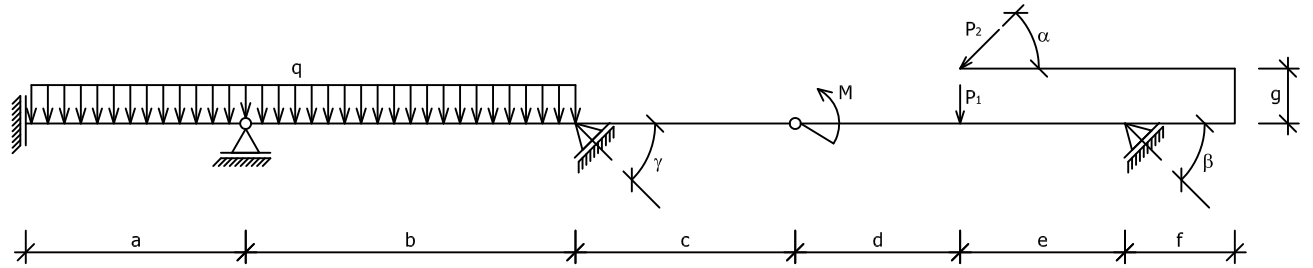
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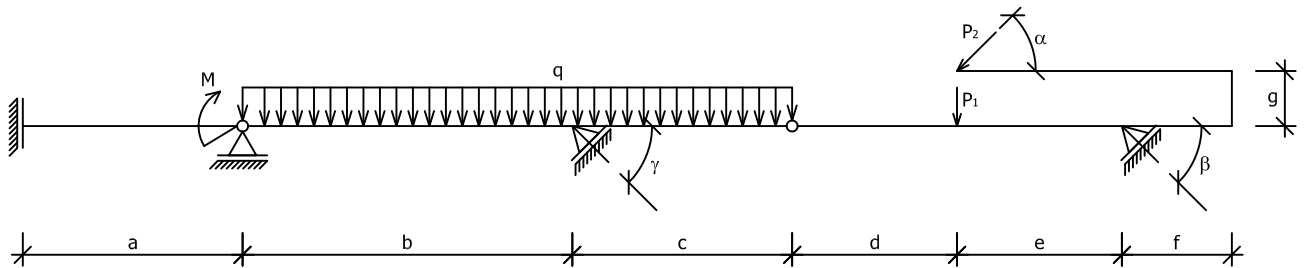
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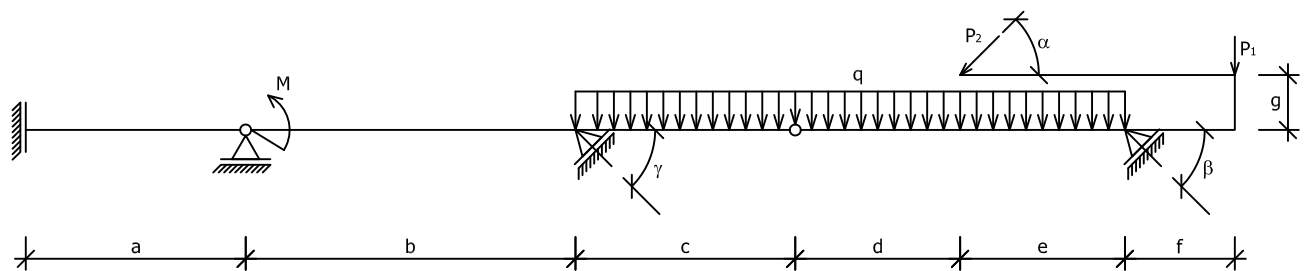
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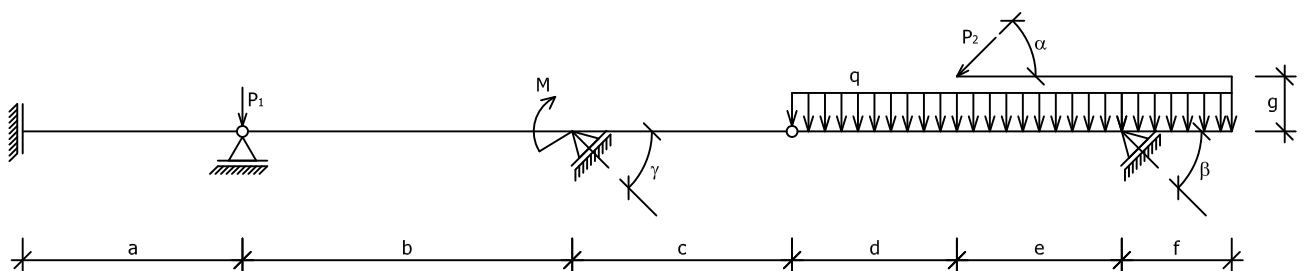
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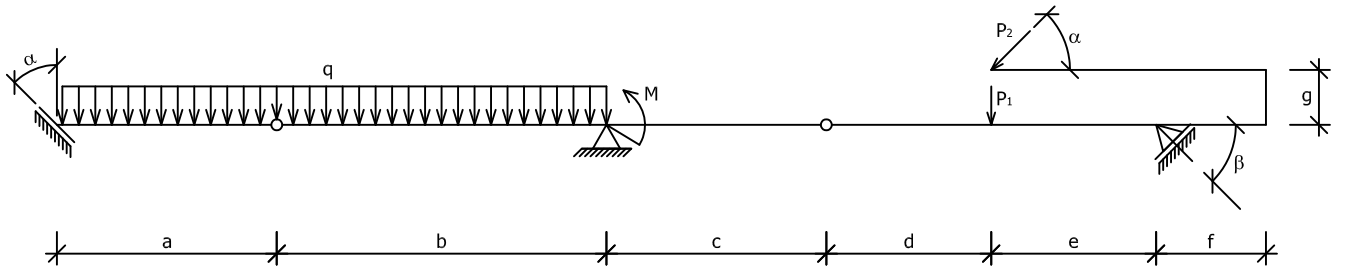


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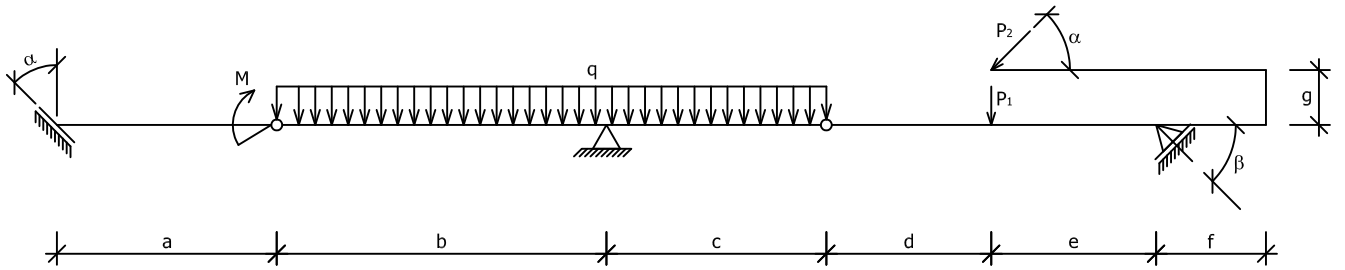




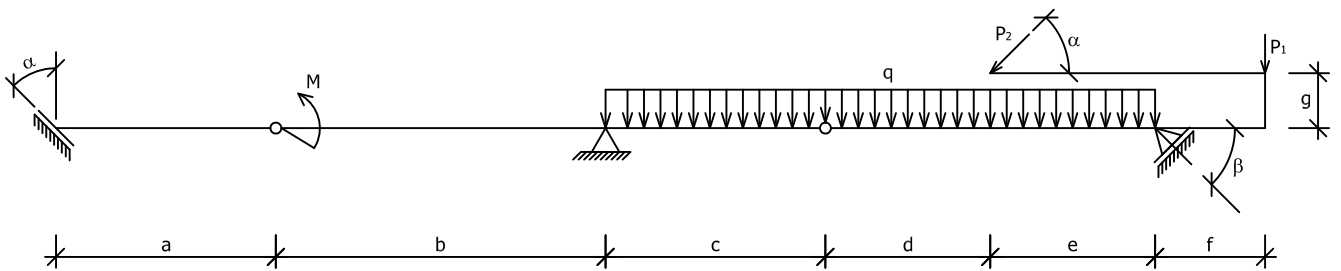
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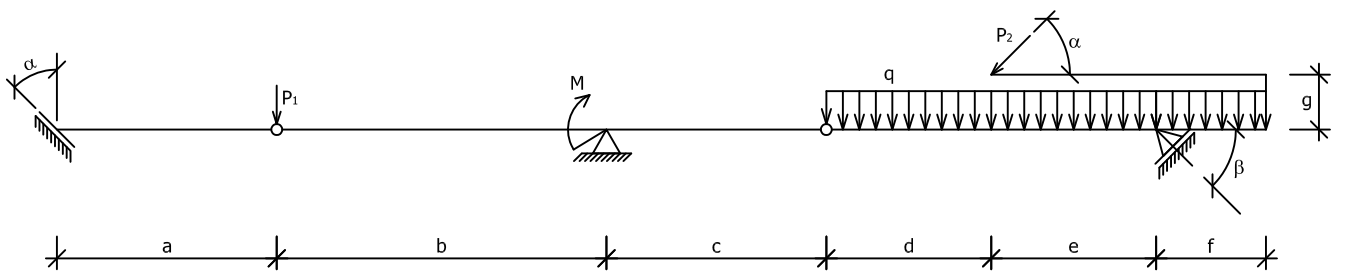
72



73



74



75

