

I.

1.

F

,

F.

F.

2.

1 2 3:

$$B = \frac{\partial U}{\partial F} = \int_{L_1} \frac{M_{y1}}{EI_{y1}} \frac{\partial M_{y1}}{\partial F} dx + \int_{L_2} \frac{M_{y2}}{EI_{y2}} \frac{\partial M_{y2}}{\partial F} dx + \int_{L_3} \frac{N_3}{EA_3} \frac{\partial N_3}{\partial F} dx. \quad (1)$$

3.

F.

4.

F.

5.

F.

6.

(1)

7.

, **E, I**

II.

1.

2.

1 2 3:

$$B = \frac{\partial U}{\partial \Phi} = \int_{L_1} \frac{M_{y1}}{EI_{y1}} \frac{\partial M_{y1}}{\partial \Phi} dx + \int_{L_2} \frac{M_{y2}}{EI_{y2}} \frac{\partial M_{y2}}{\partial \Phi} dx + \int_{L_3} \frac{N_3}{EA_3} \frac{\partial N_3}{\partial \Phi} dx. \quad (2)$$

3.

4.

5.

6.

(2)

7.

, **E, I**

III.

1.

2.

Bh :

Bv

$$= \sqrt{\frac{2}{Bv} + \frac{2}{Bh}}. \quad (3)$$

IV.

1.

2.

F,

3.

()

V.

,
,
: F M .

VI.

,
,
: F M , M .

VII.

1.

,
.

2.

V () ,
V.