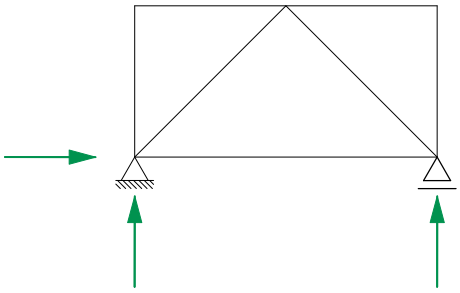
6.2

Internal statical Determinacy

A plane is internally statically determined if the number of truss members (S) plus the possible reaction forces (A) of the system equal twice the number of truss nodes (K).

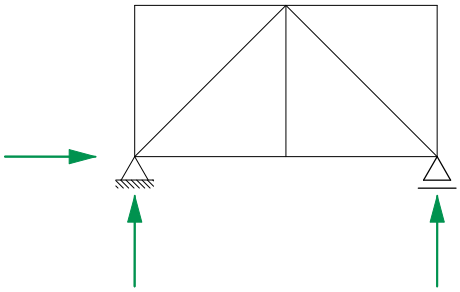
S + A = 2K = statically determinate
S + A < 2K = statically indeterminate (unstable)
S + A > 2K = statically indeterminate (overly determinate)

To have an internally statically determined truss and thus ensure its stability and stiffness, the truss must always be triangulated. In quadrangular fields one bar is missing, which leads to an unstable system. There can also be too many bars. These so-called overly determined trusses can no longer be analysed by simple means such as graphic statics.



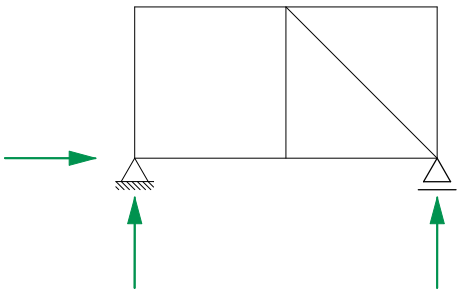
7 + 3 = 2 · 5 ✓

↳ statically determined
= 1 possible solution for force flow



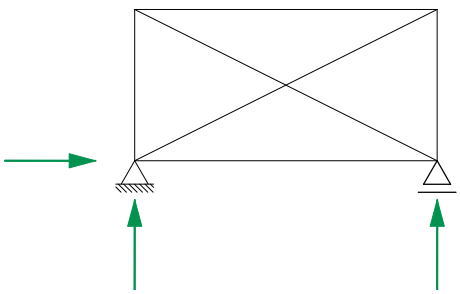
9 + 3 = 2 · 6 ✓

↳ statically determined
= 1 possible solution for force flow



8 + 3 < 2 · 6 ×

↳ not enough bars/members
= unstable, will collapse (not triangulated)



8 + 3 > 2 · 5 ×

↳ too many bars/members
= many possible force flows