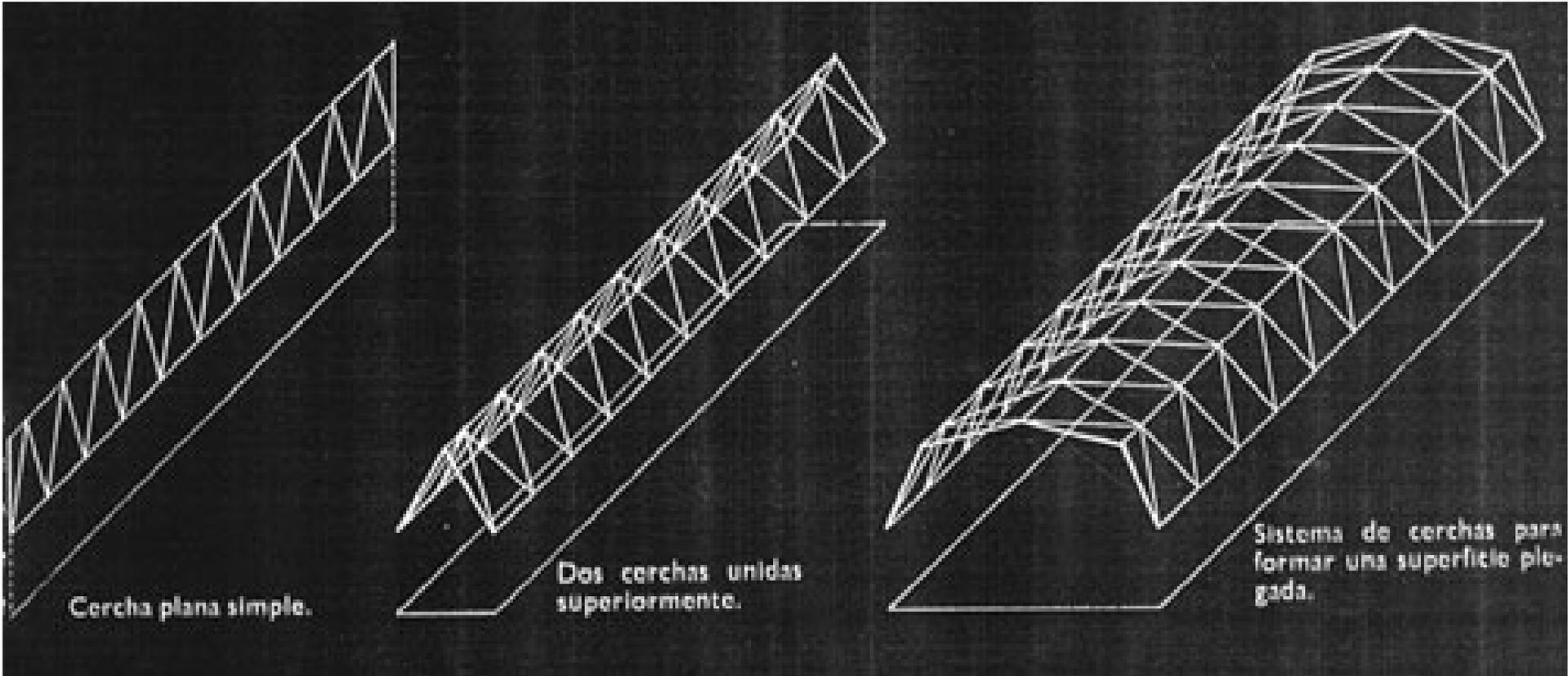


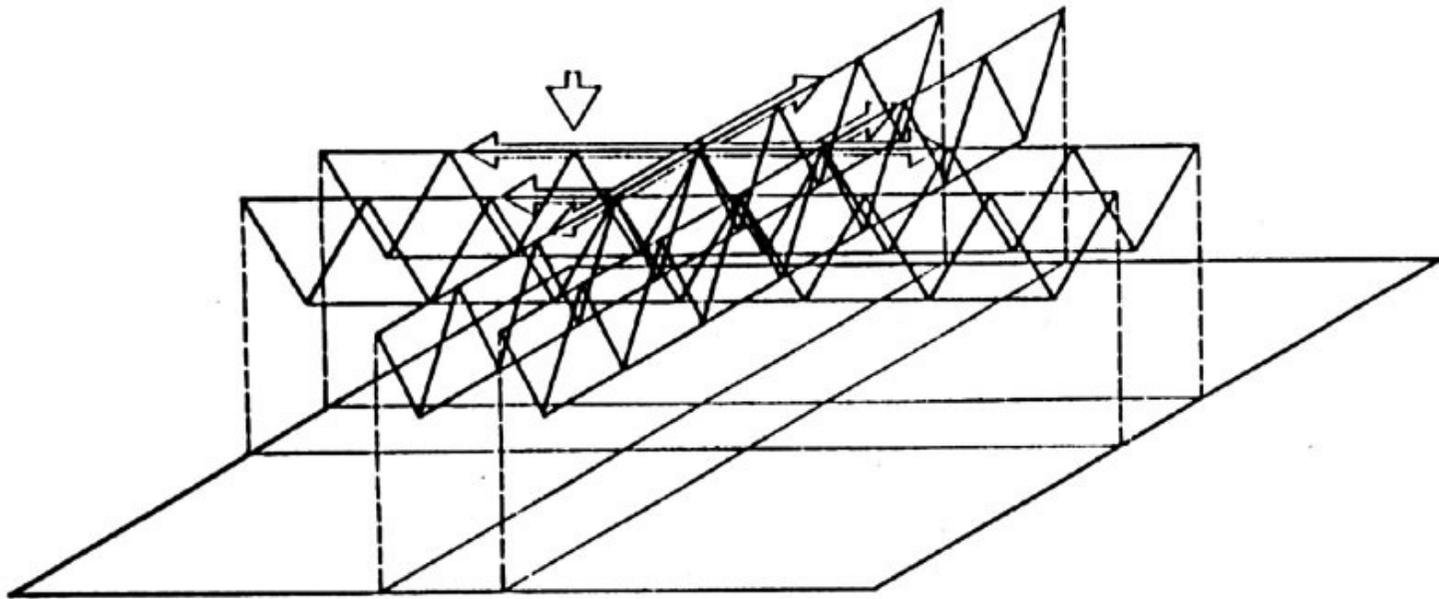
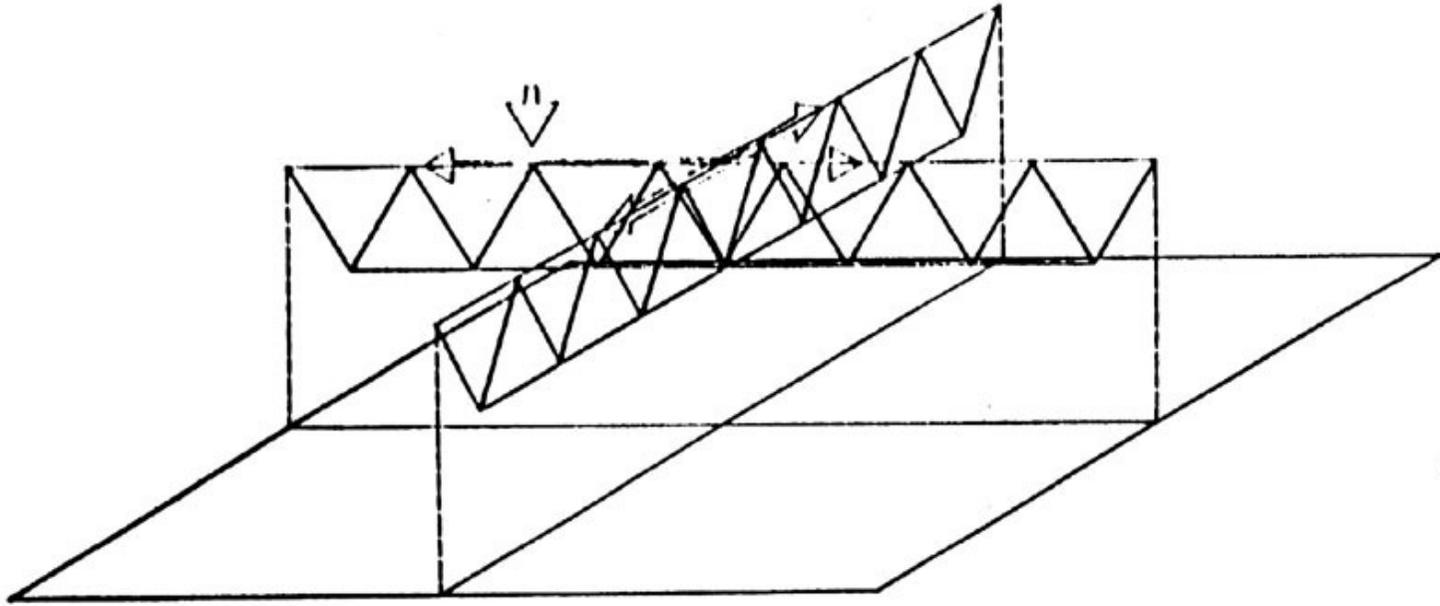
***SEGUNDA FAMILIA
ESTRUCTURAS DE BIELAS***

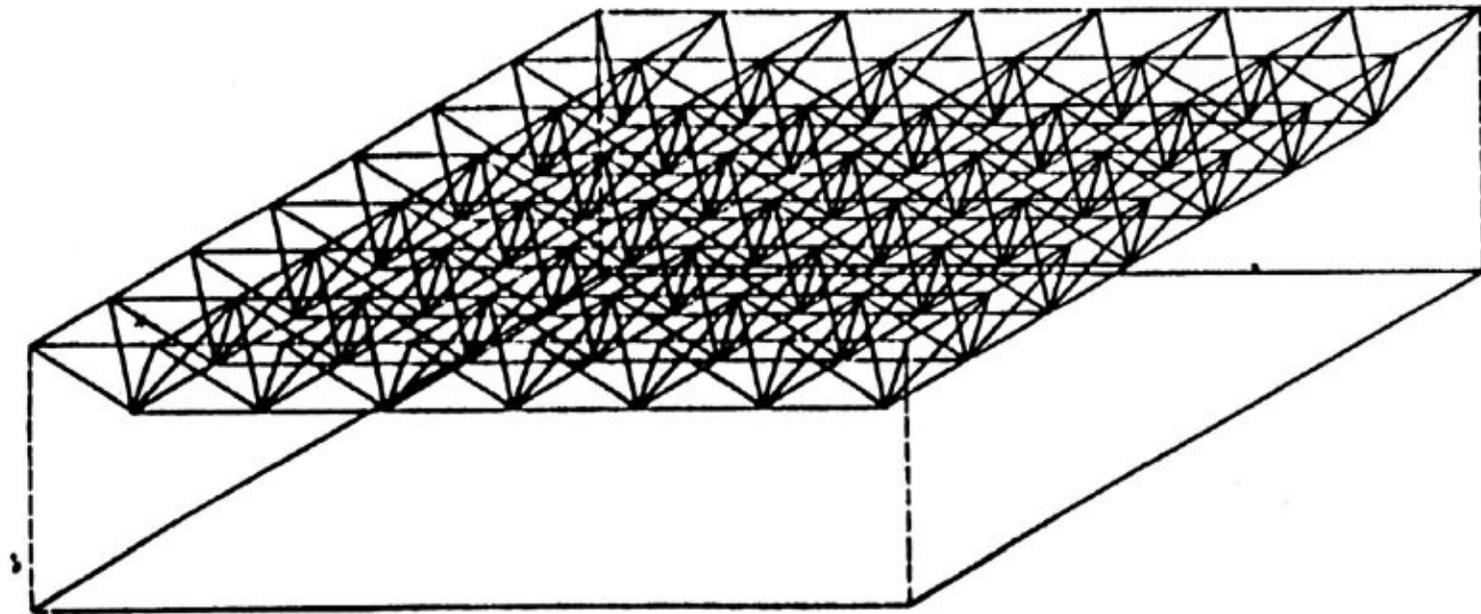
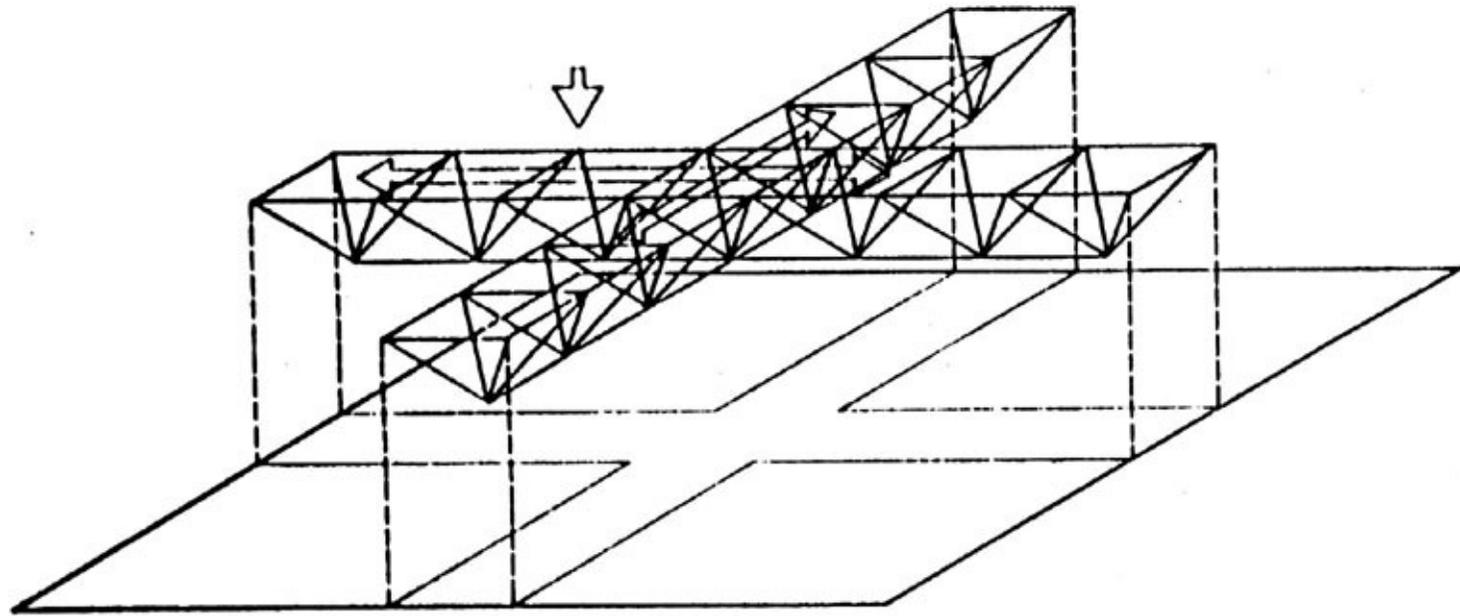
SEGUNDA FAMILIA ESTRUCTURAS DE BIELAS

**SON ESTRUCTURAS EN QUE LA FORMA ES
INDEPENDIENTE DEL SISTEMA DE
CARGAS.**

**LOS ESFUERZOS INTERNOS SIGUEN
AXIALMENTE LOS EJES DE LOS
ELEMENTOS QUE LA COMPONEN.**





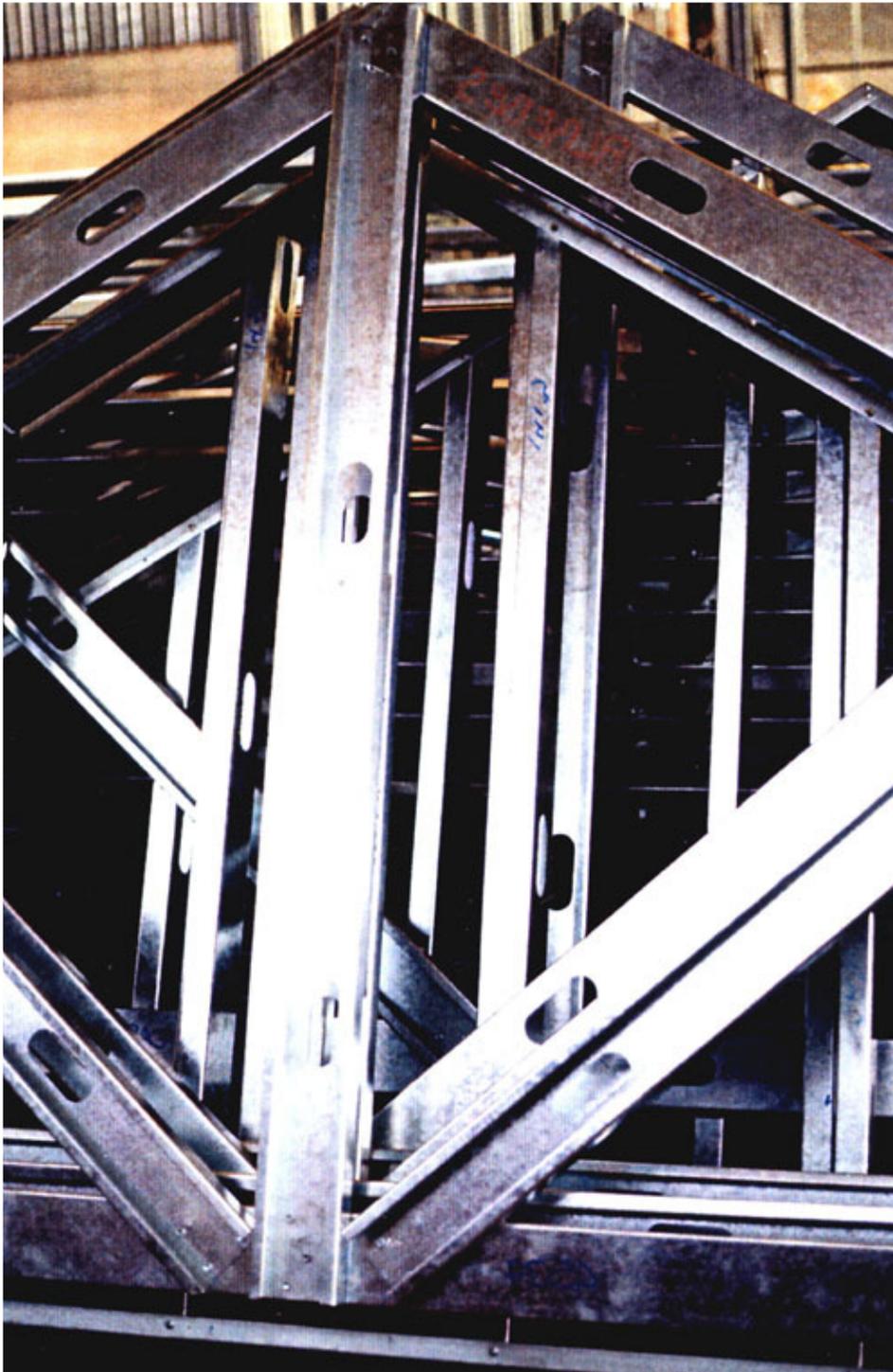


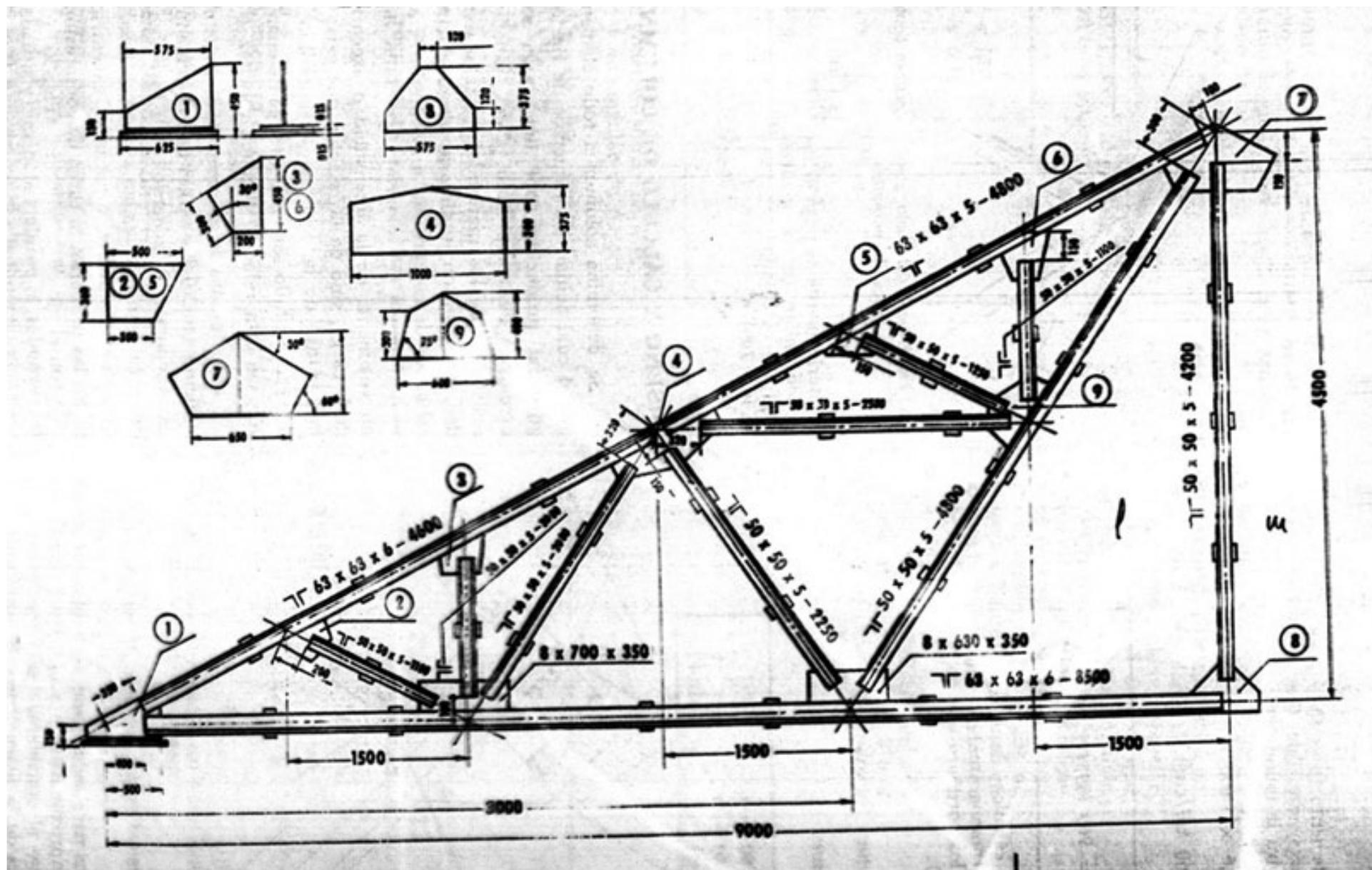
CARACTERÍSTICAS

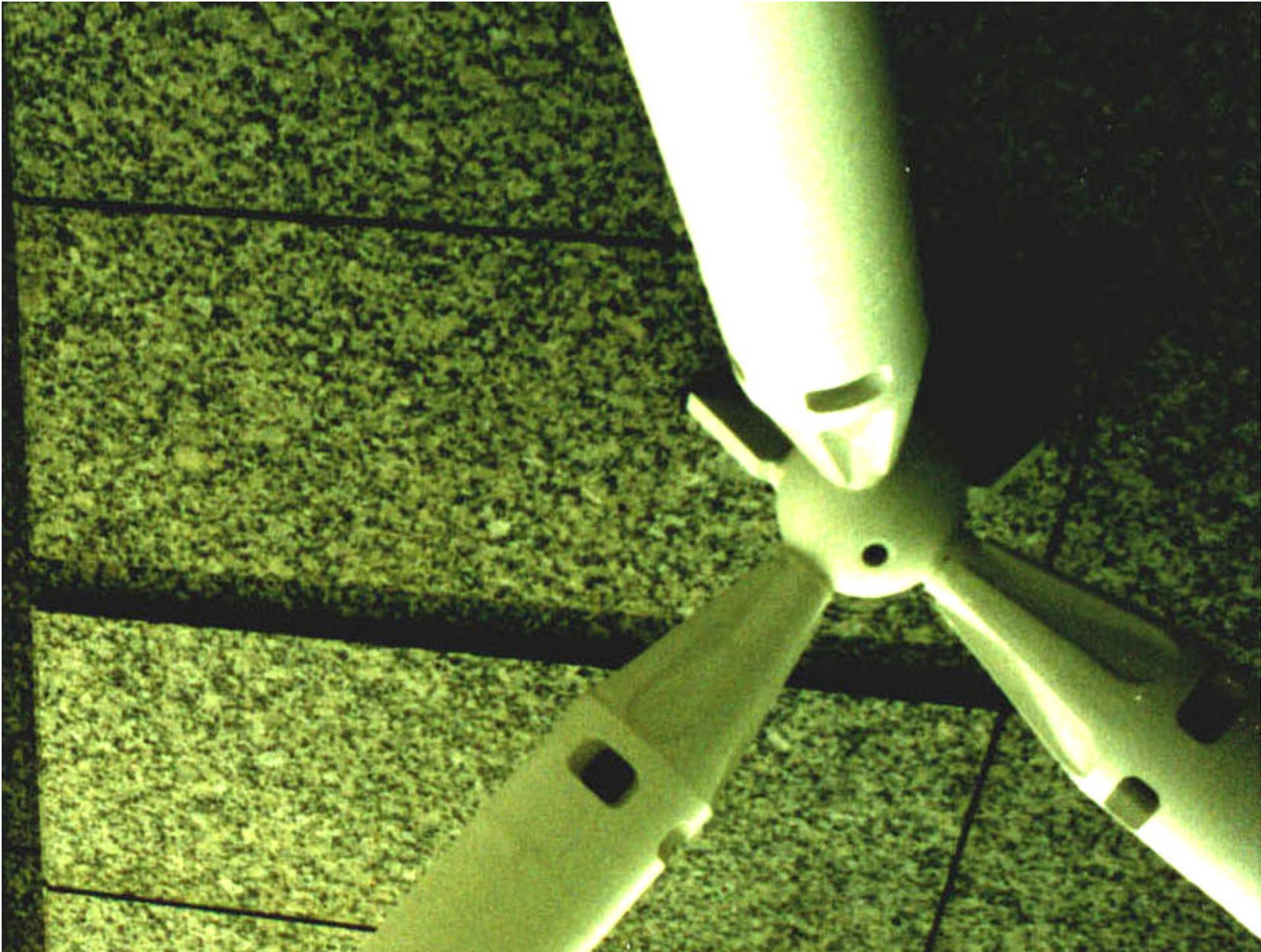
PIEZAS: BARRAS DE LONGITUD PREDOMINANTE EN RELACIÓN A LAS DIMENSIONES DE LAS SECCIONES.

NUDOS: ARTICULACIÓN DONDE CONCURREN VARIAS BARRAS.

APOYOS: NUDO COMPLETADO CON UN DISPOSITIVO DE UNIÓN CON EL RESTO DE LA ESTRUCTURA.









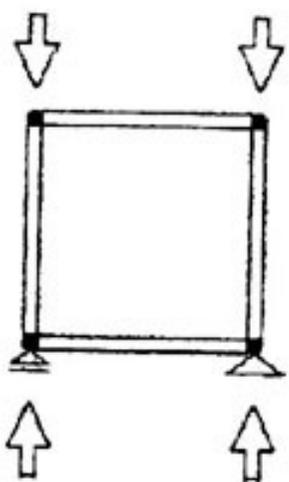
CONFIGURACIÓN GEOMÉTRICA

TRABAJANDO CON RETICULADOS
ANALIZABLES EN UN PLANO, LA UNIDAD
GEOMÉTRICA BÁSICA SERÁ EL
TRIÁNGULO.

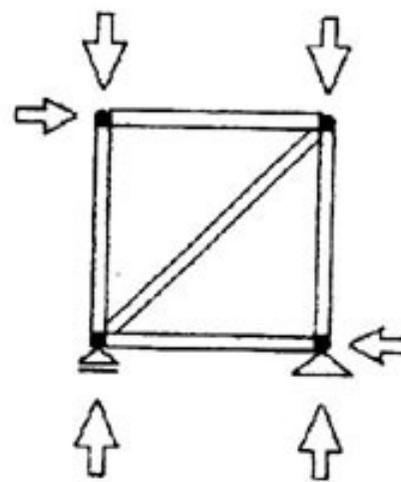
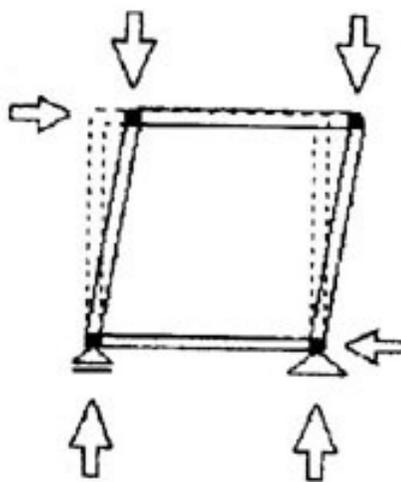
$$2n - b = 3$$

b - nº de barras

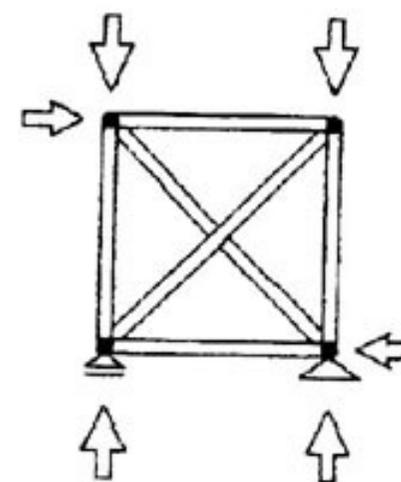
n - nº de nodos



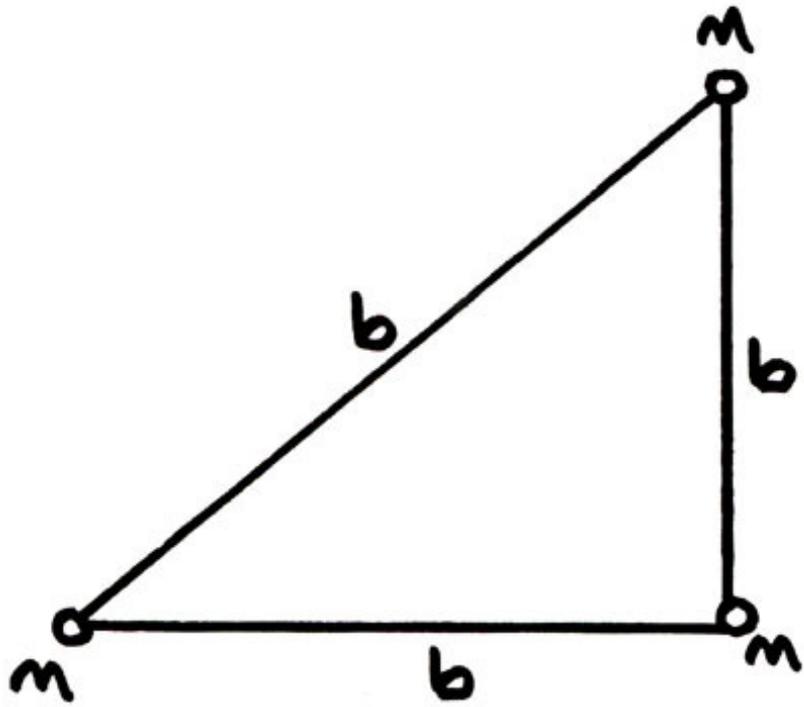
$8 - 4 = 4 > 3$
hipostática

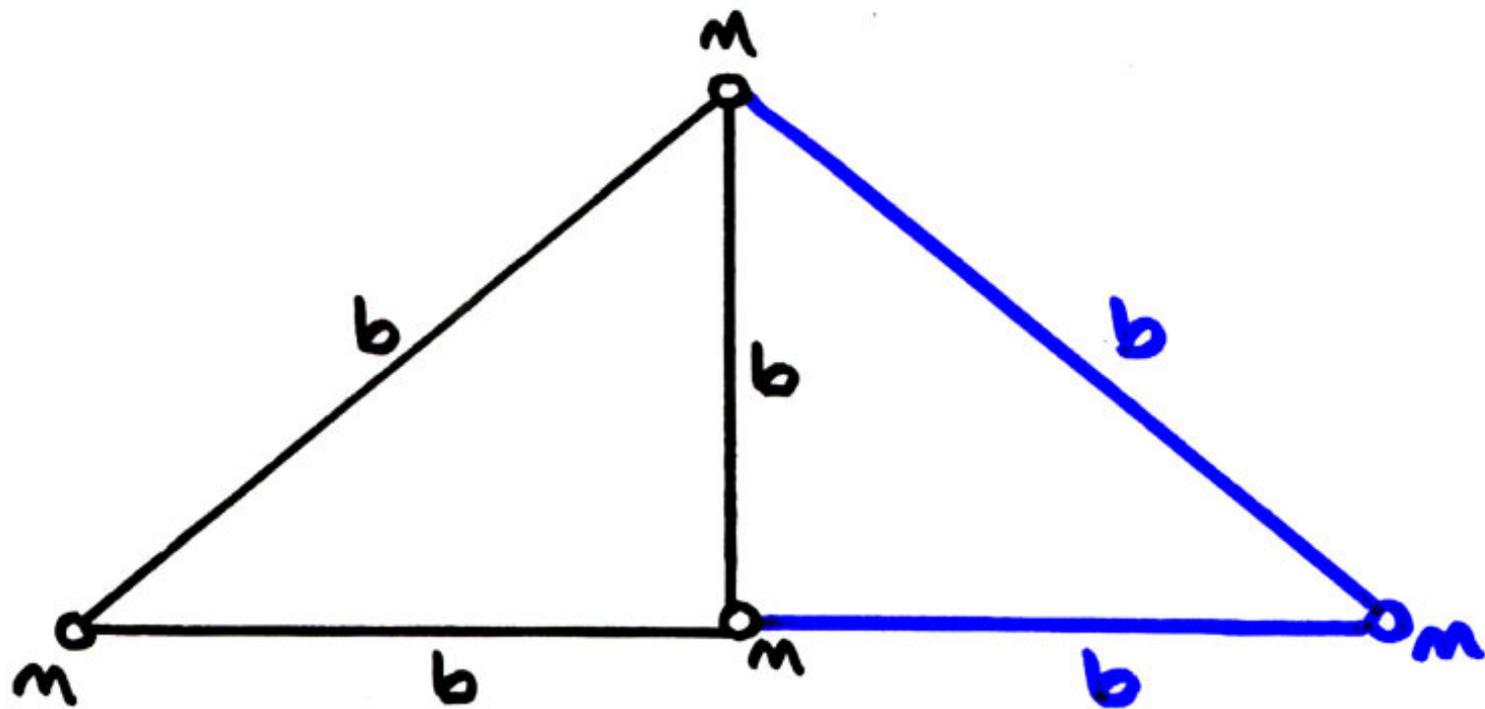


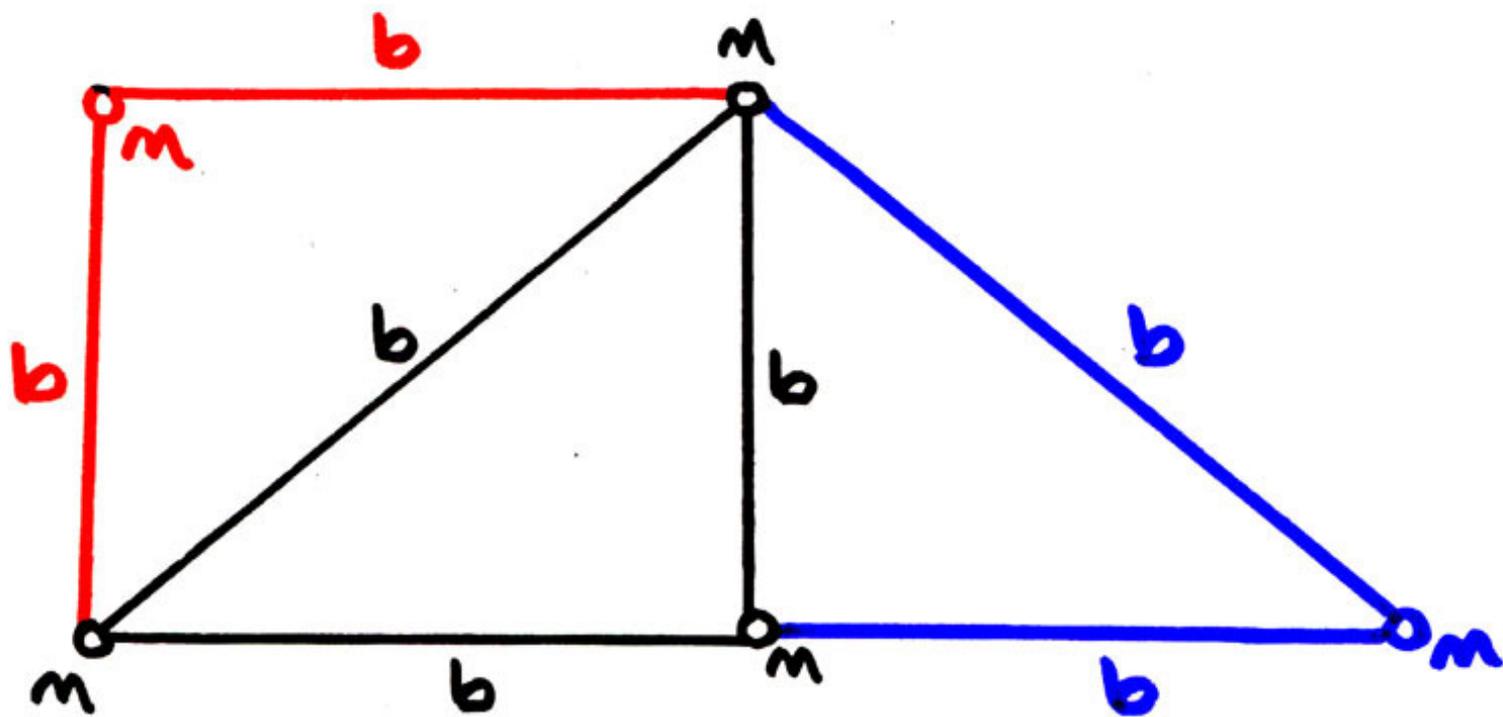
$8 - 5 = 3$
isostática

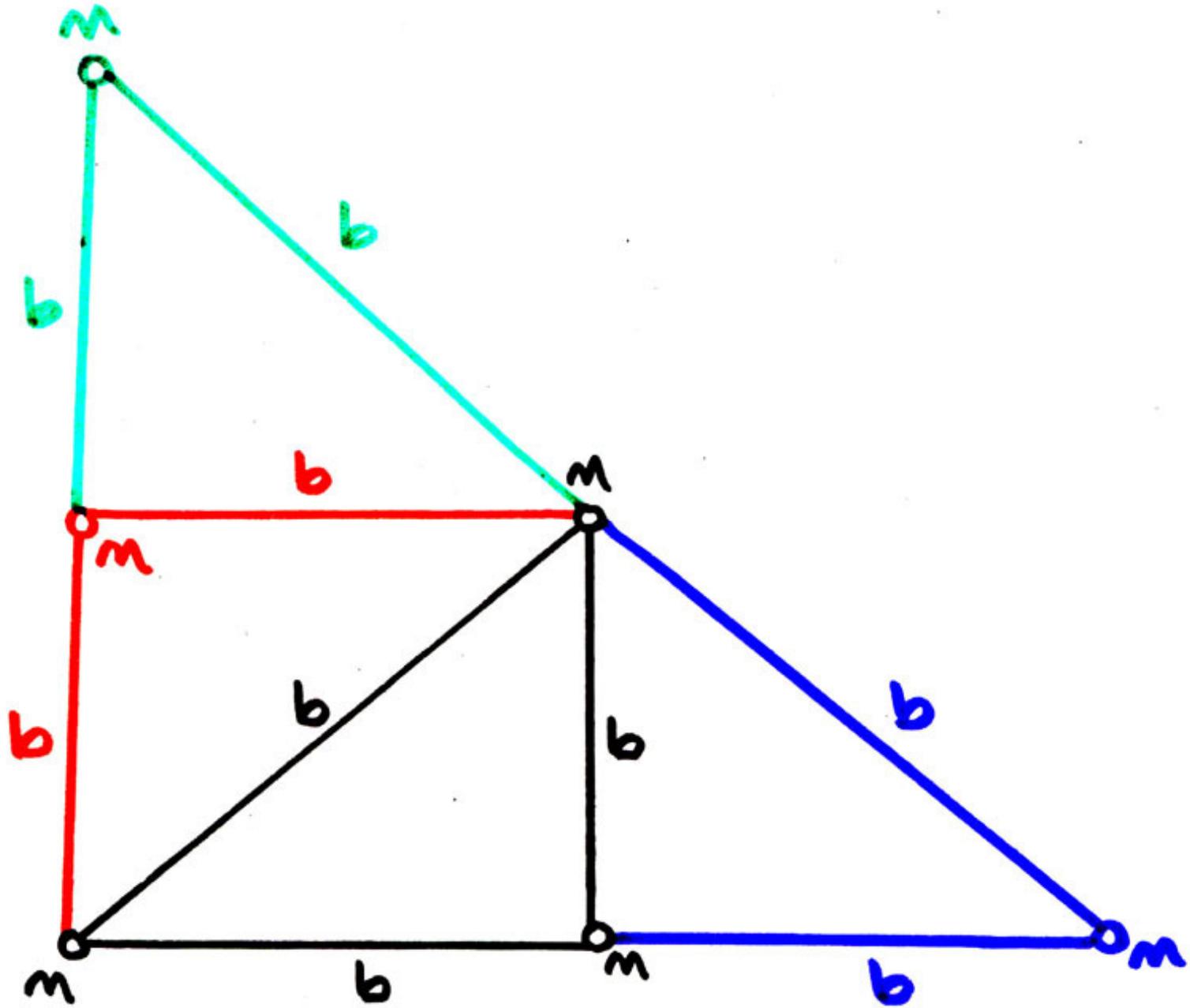


$8 - 6 = 2 < 3$
hiperestática









MODELO FUNCIONAL:

LOS EJES DE LAS BARRAS CONCURREN EN UN PUNTO (NUDO IDEAL) ASIMILABLE A UNA ARTICULACIÓN. LAS ACCIONES EXTERNAS, ASIMILADAS A FUERZAS CONCENTRADAS, ESTÁN APLICADAS EN LOS NUDOS.

MODELO DE COMPORTAMIENTO:

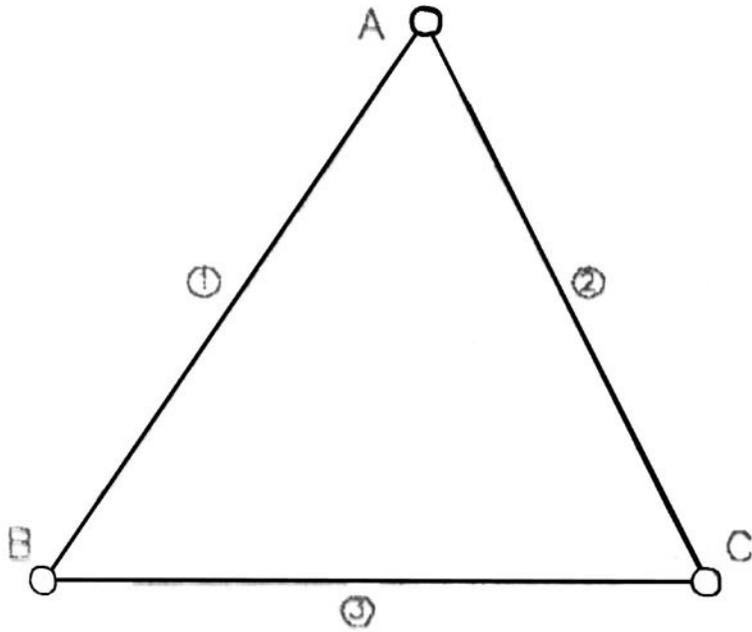
LAS BARRAS SOLICITADAS POR FUERZAS AXILES DE TRACCIÓN PRESENTAN ALARGAMIENTOS

LAS BARRAS SOLICITADAS POR FUERZAS AXILES DE COMPRESIÓN PRESENTAN ACORTAMIENTOS.

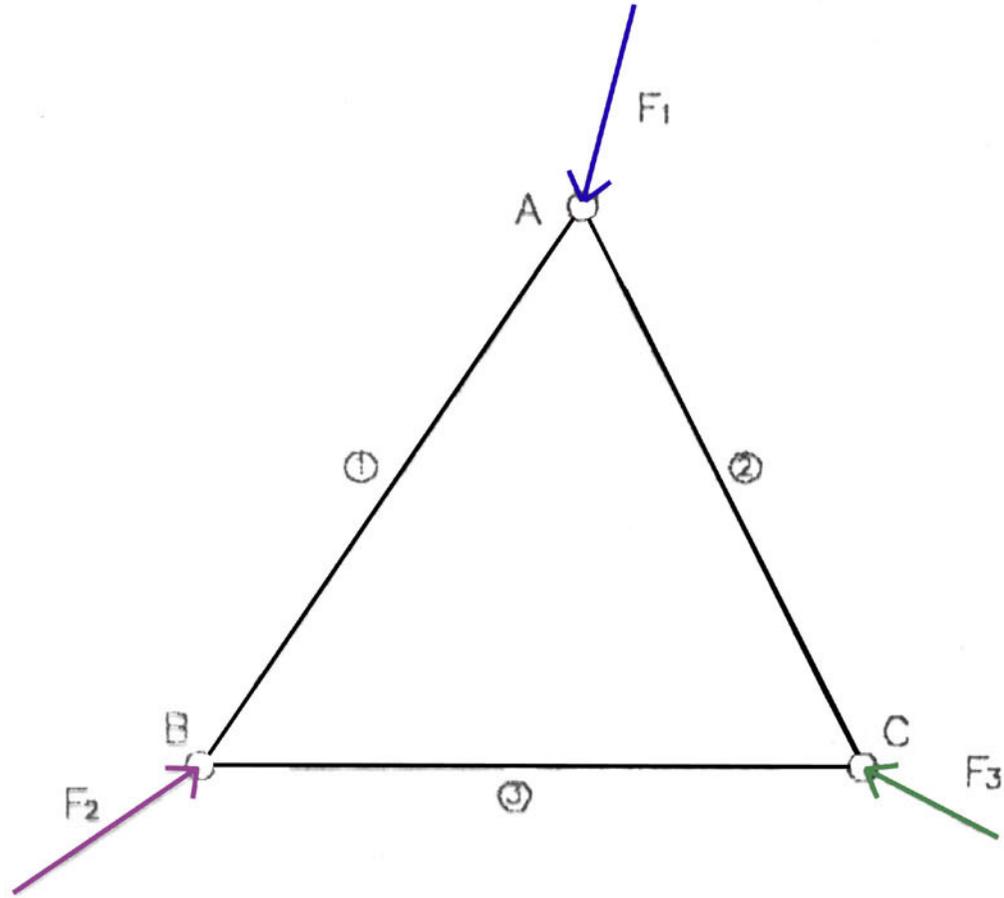
MODELO DE MATERIAL

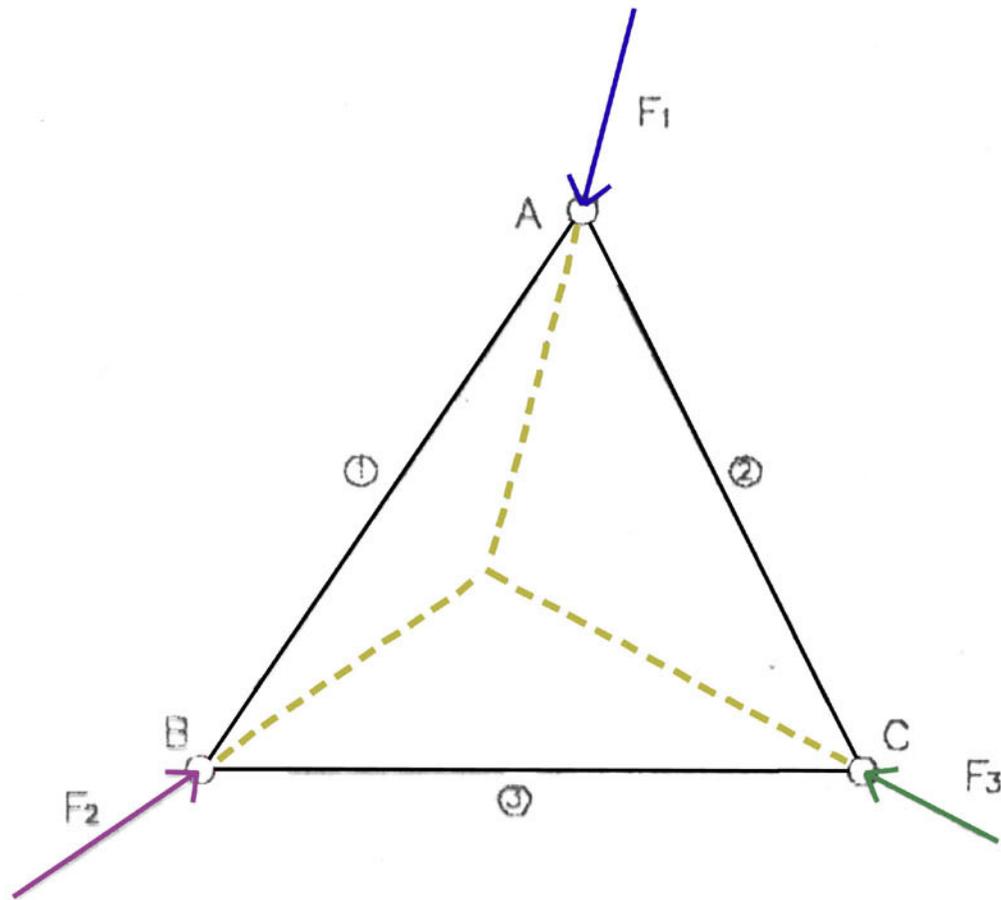




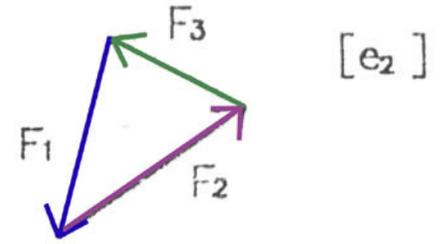


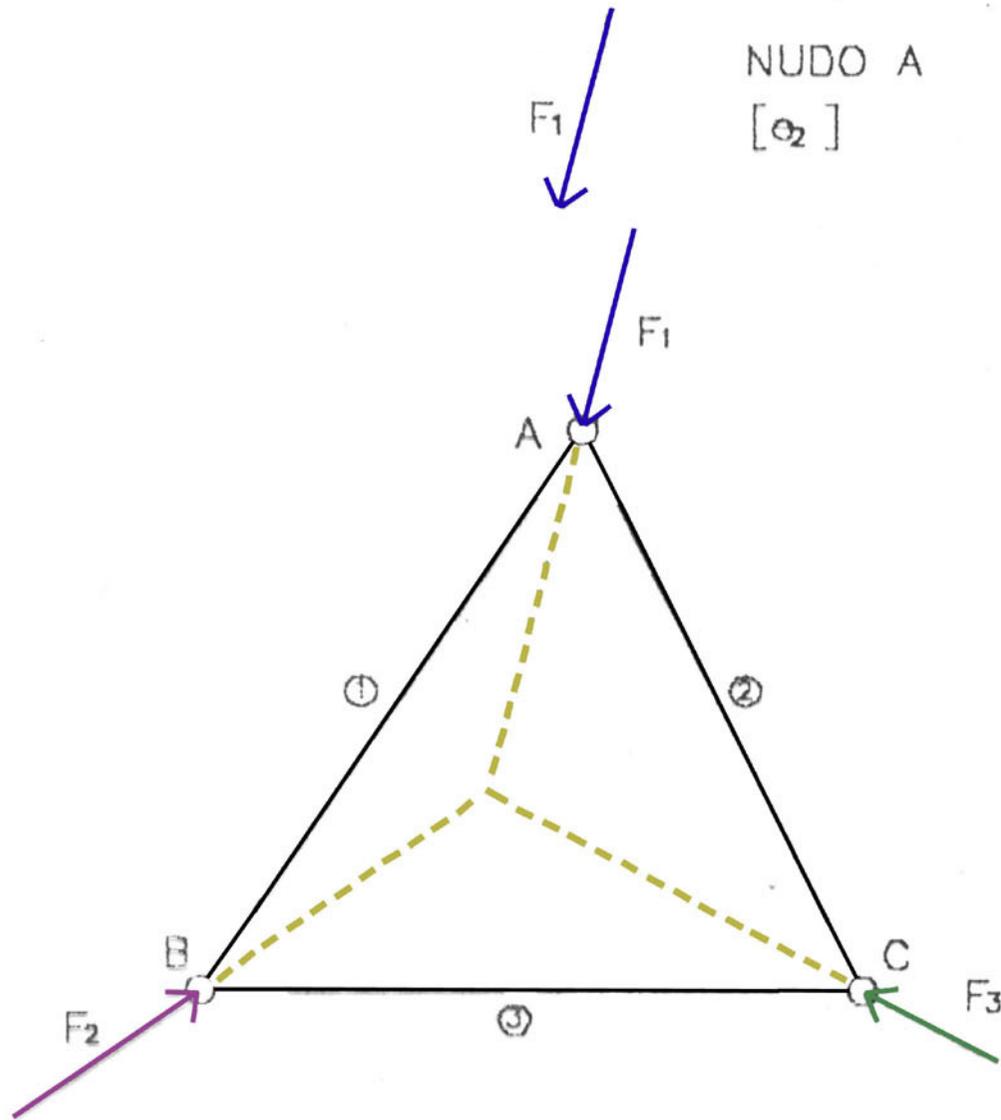
UNIDAD GEOMÉTRICA ELEMENTAL



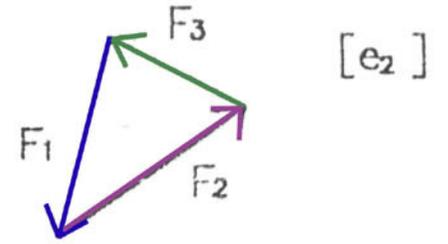


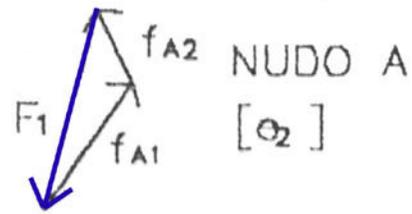
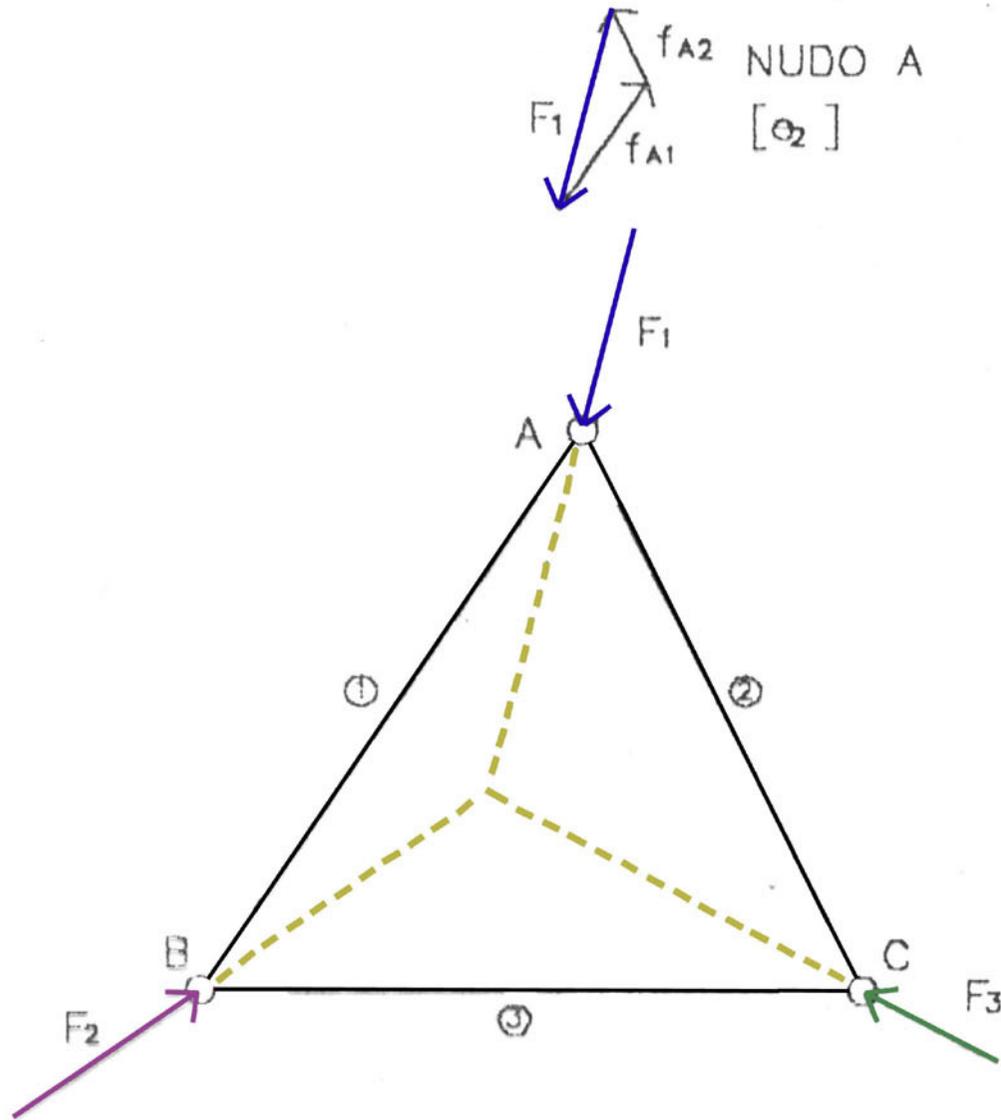
Equilibrio de conjunto





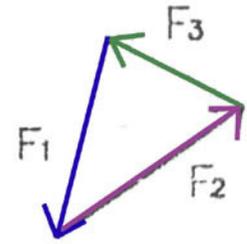
Equilibrio de conjunto

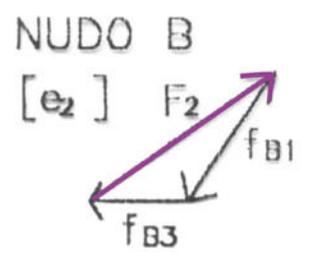
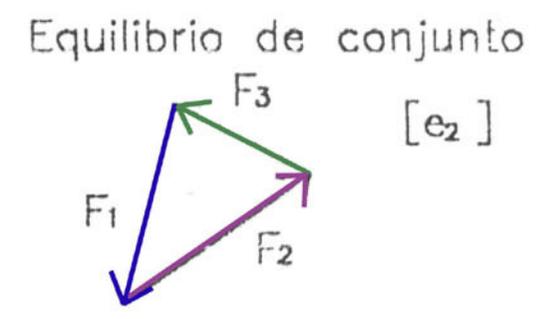
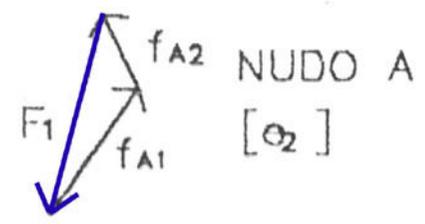
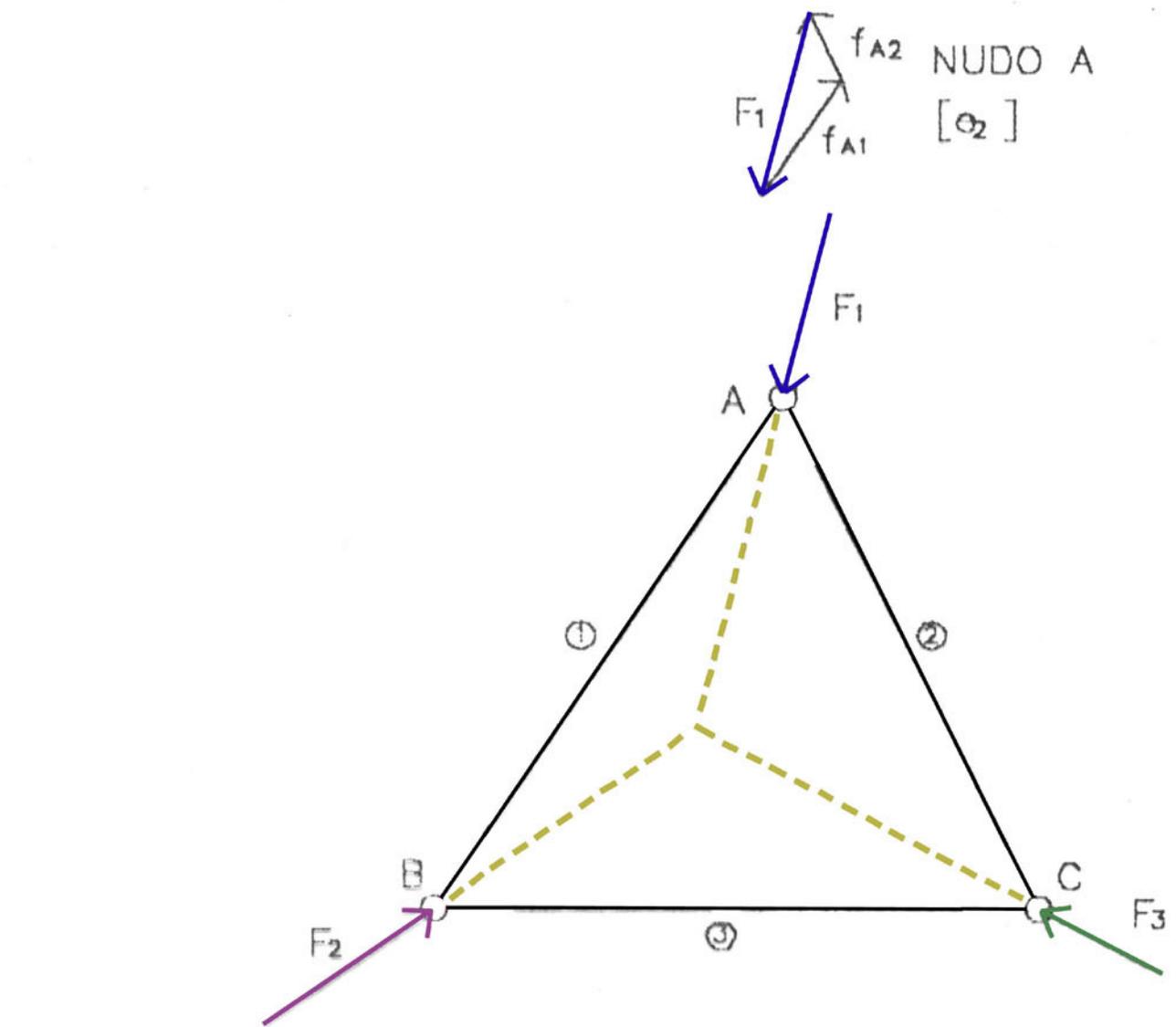


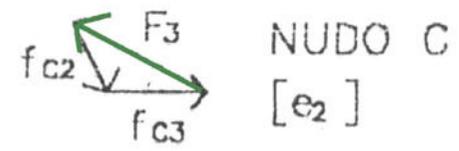
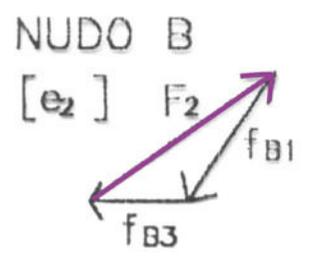
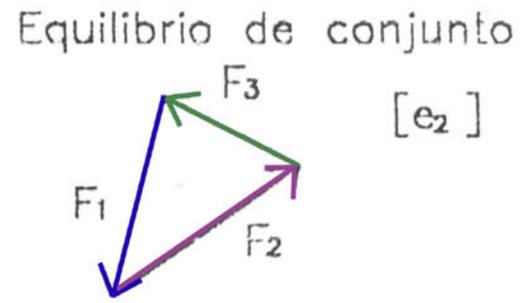
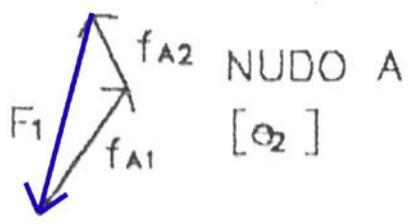
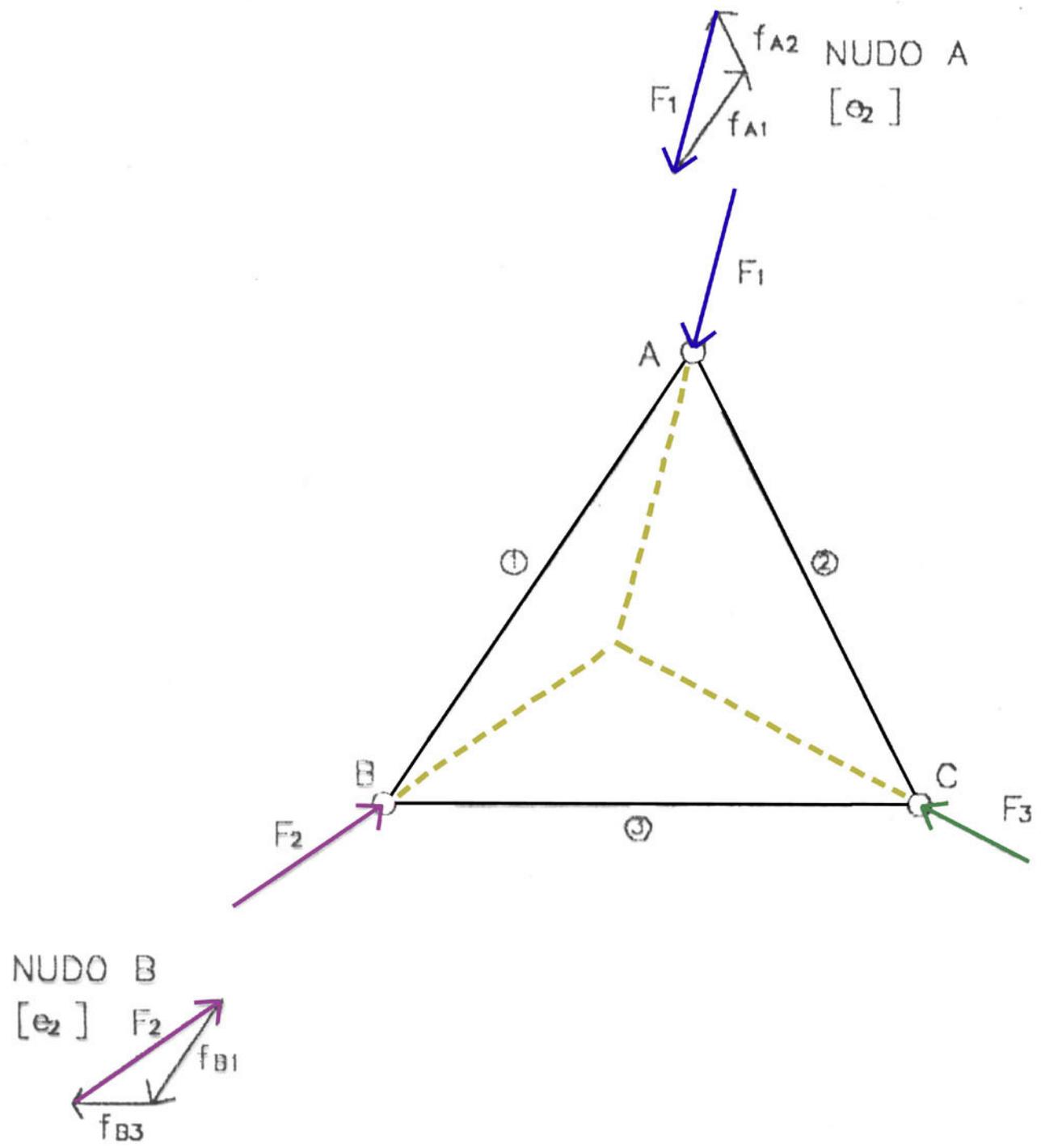


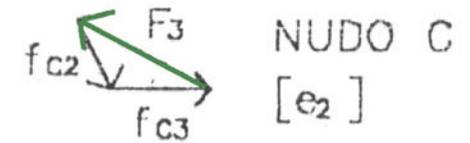
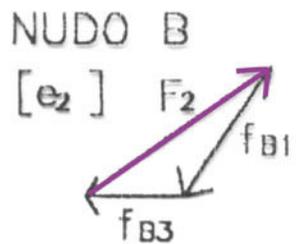
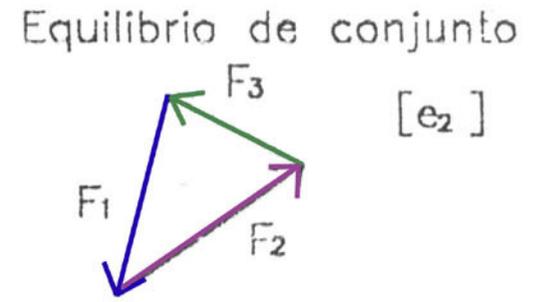
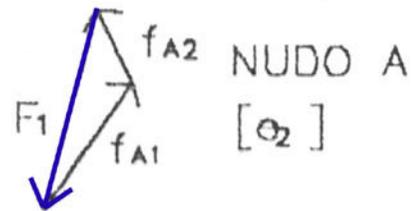
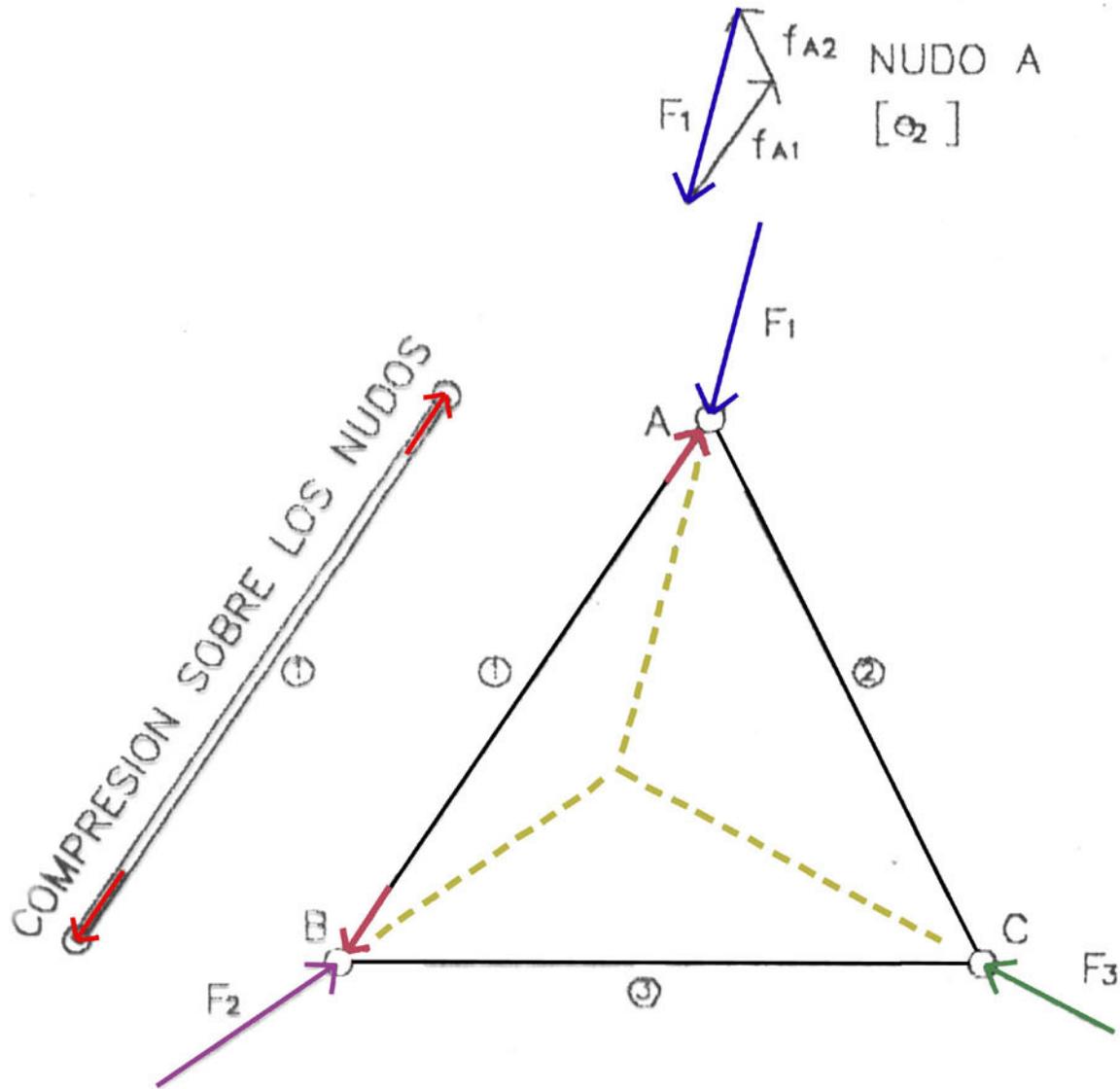
NUDO A
[e₂]

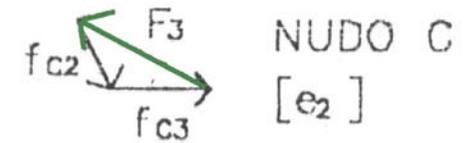
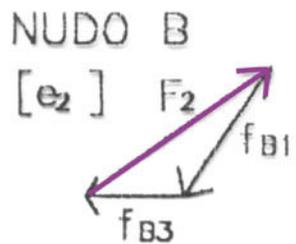
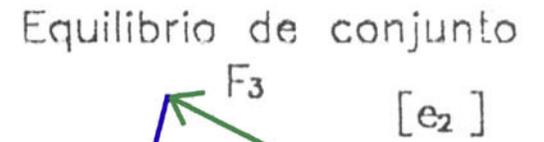
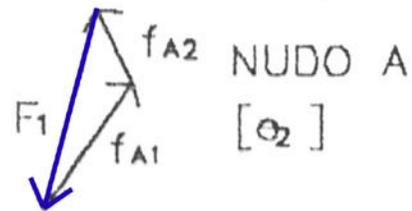
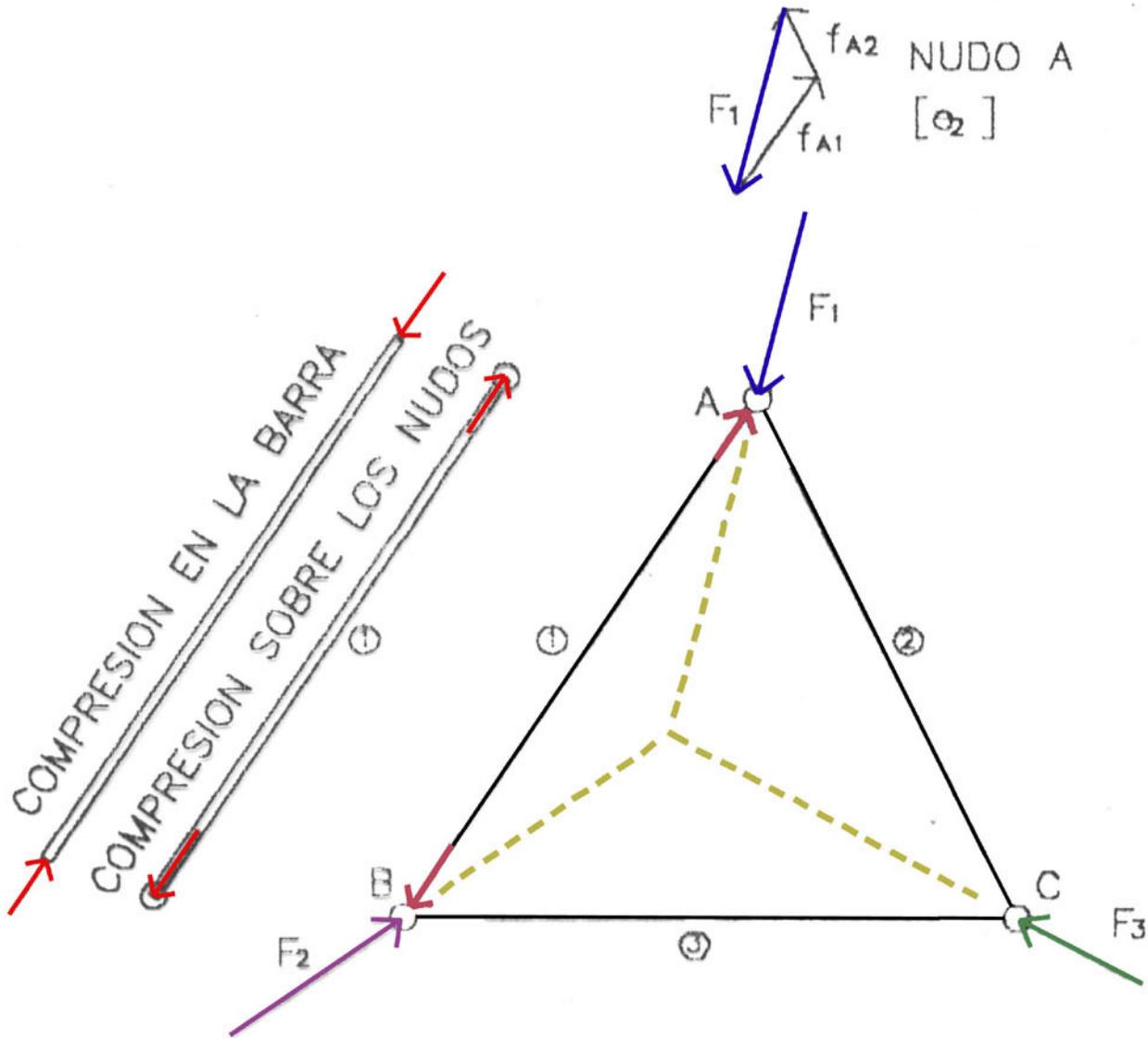
Equilibrio de conjunto
[e₂]

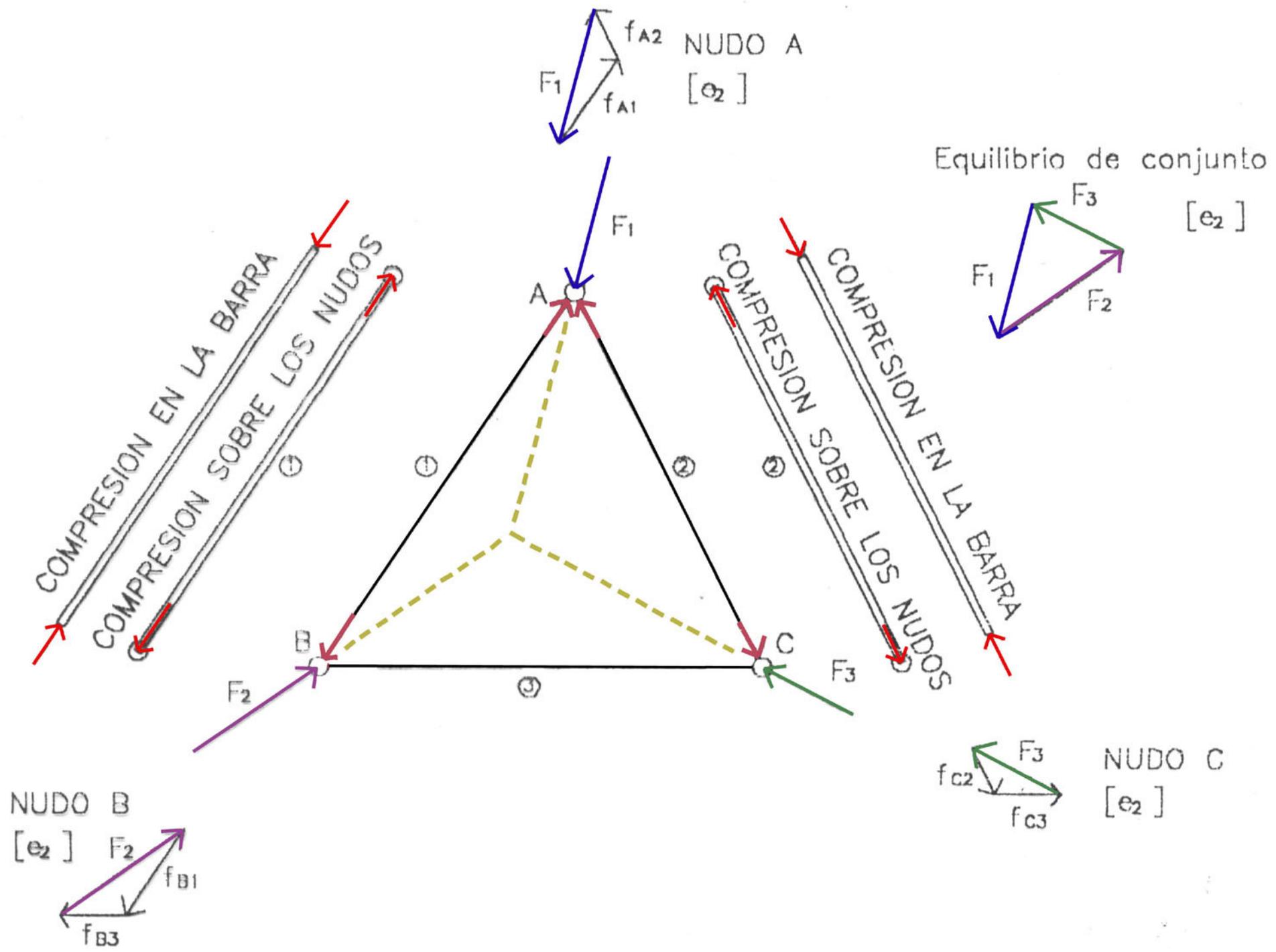


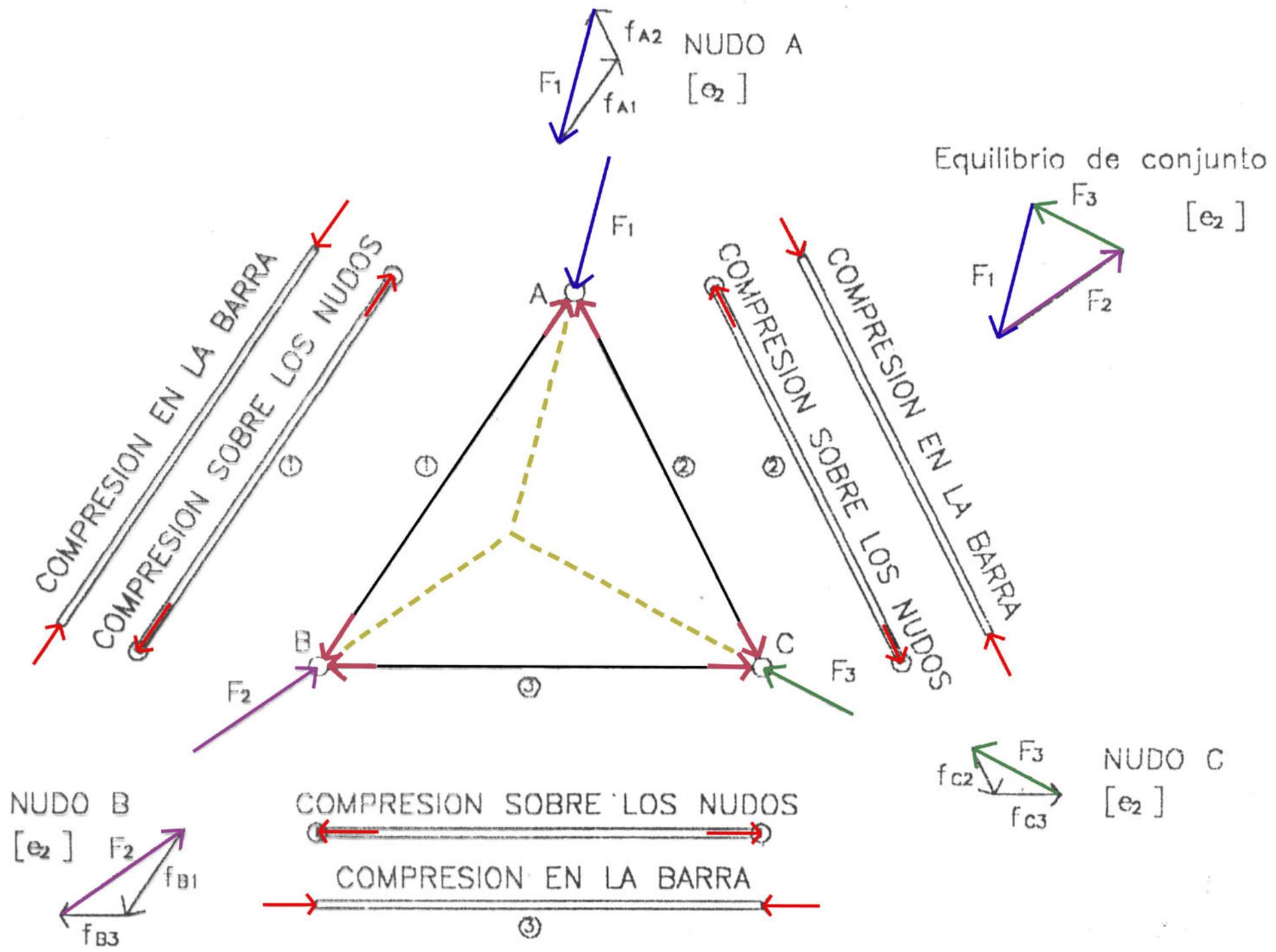


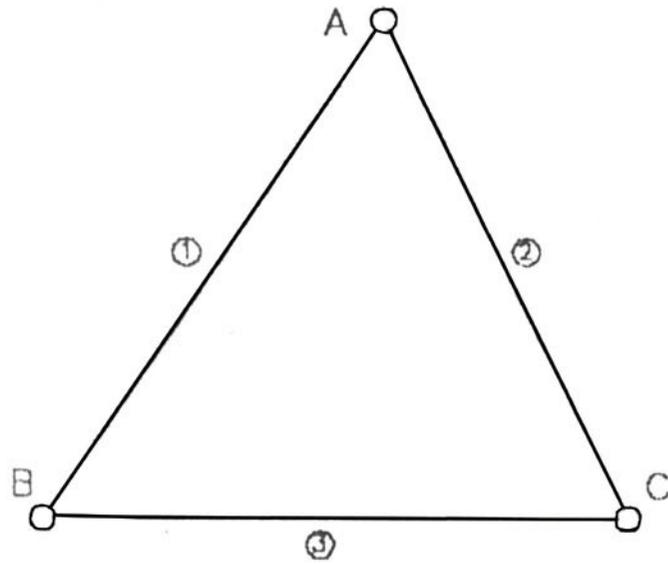




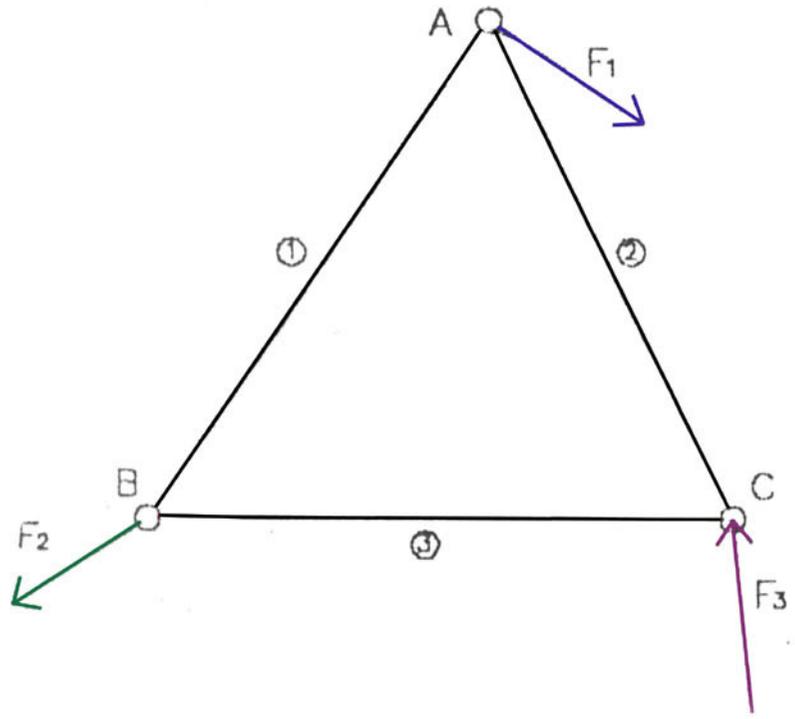


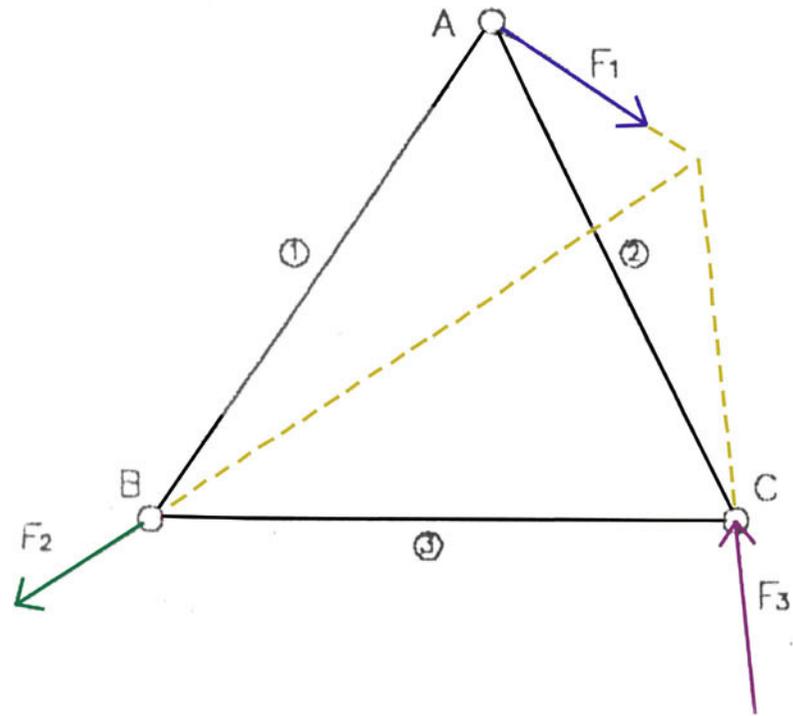




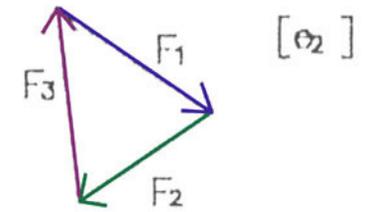


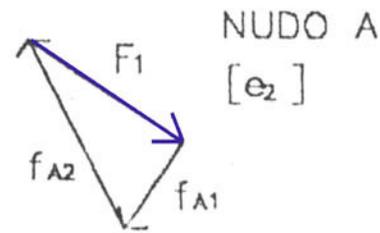
UNIDAD GEOMÉTRICA ELEMENTAL



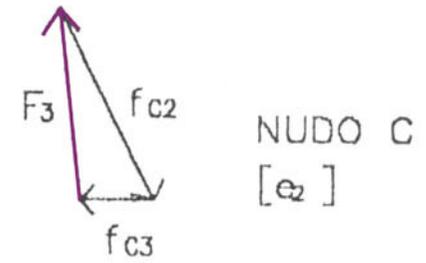
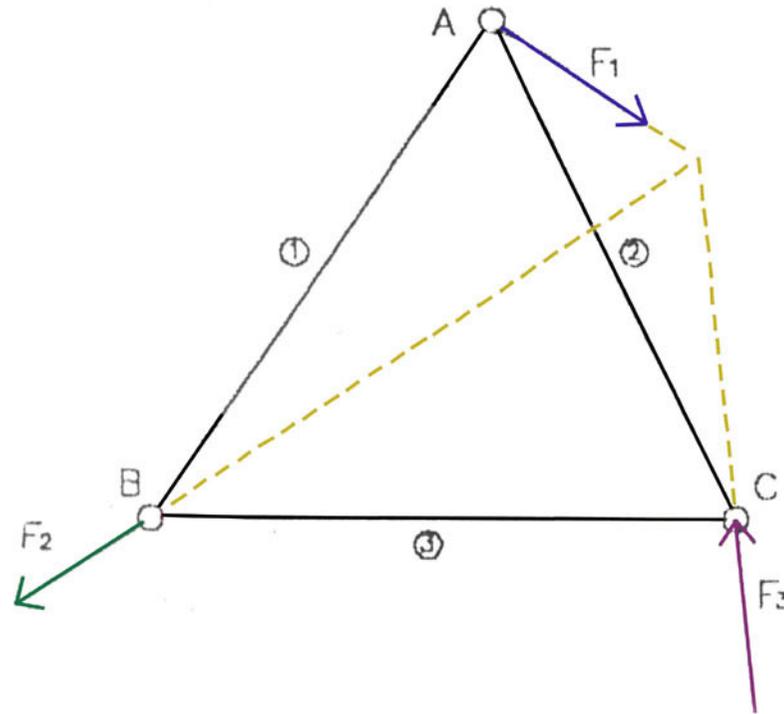
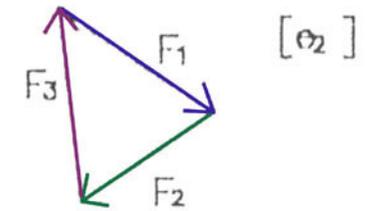


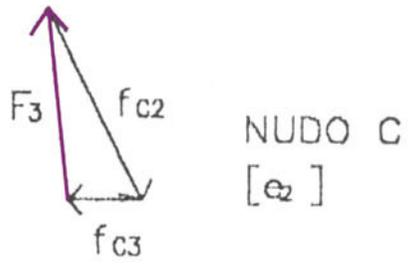
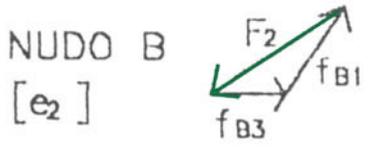
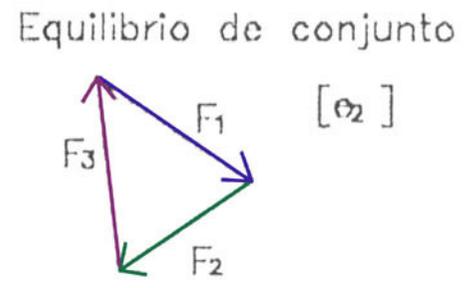
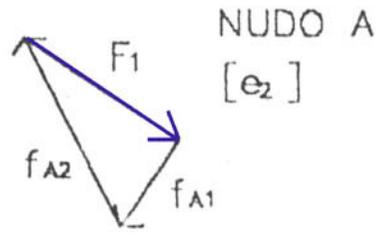
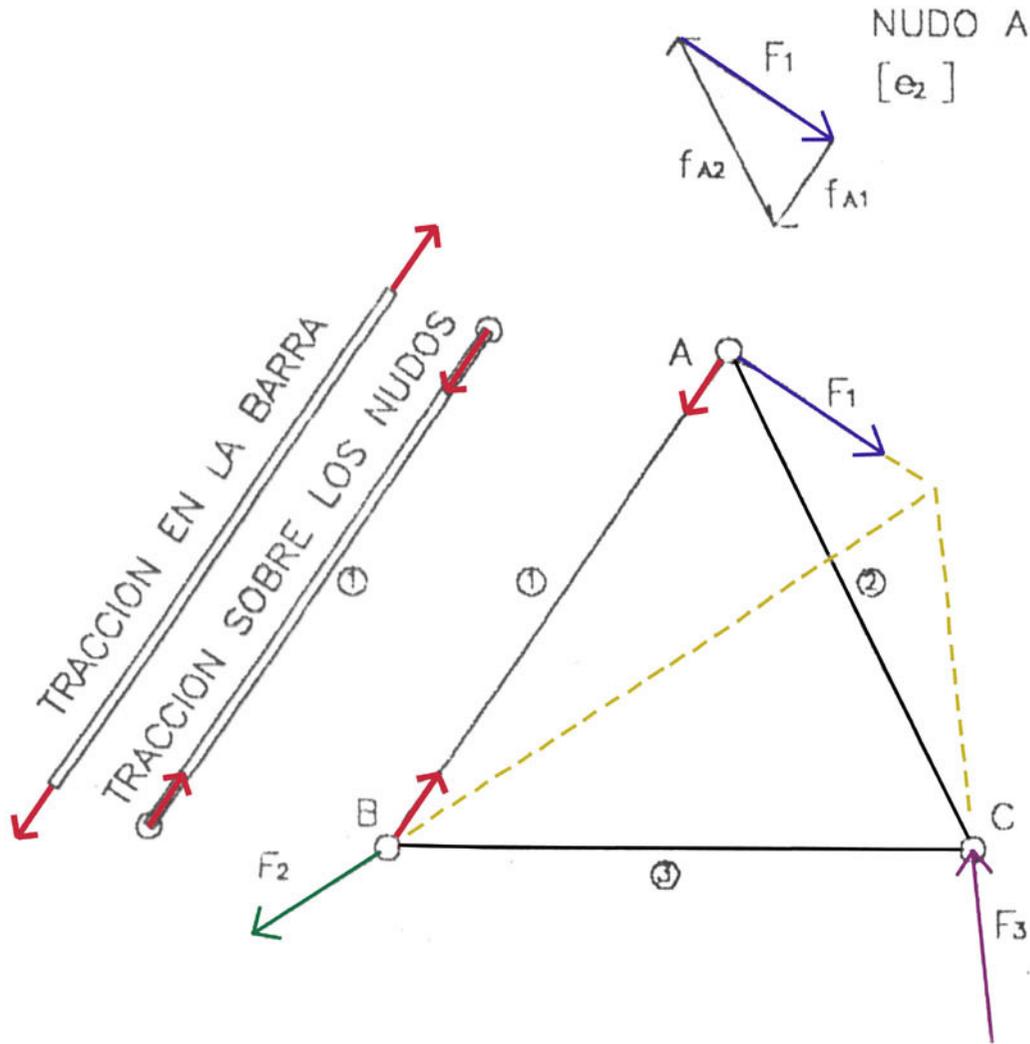
Equilibrio de conjunto

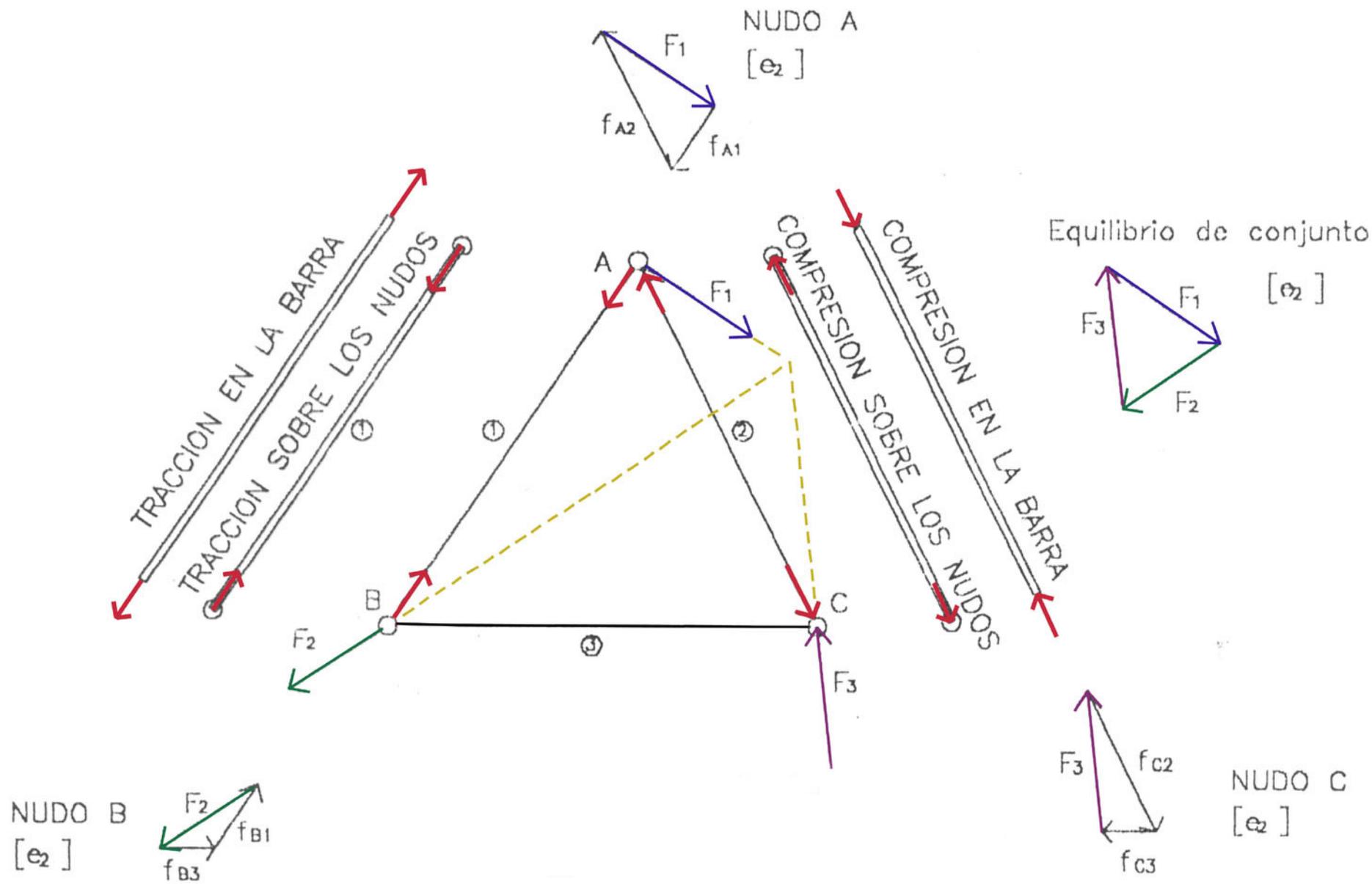


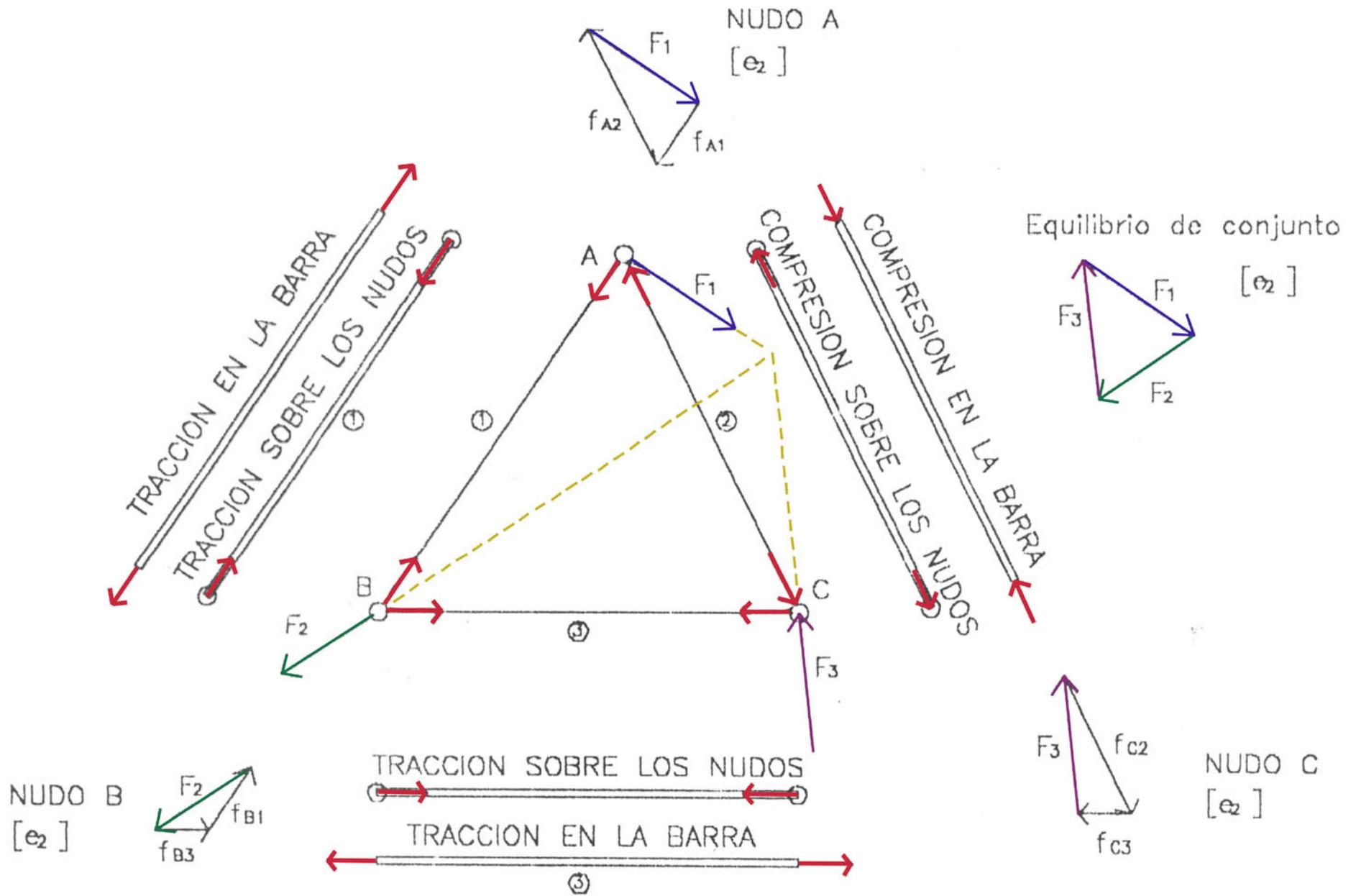


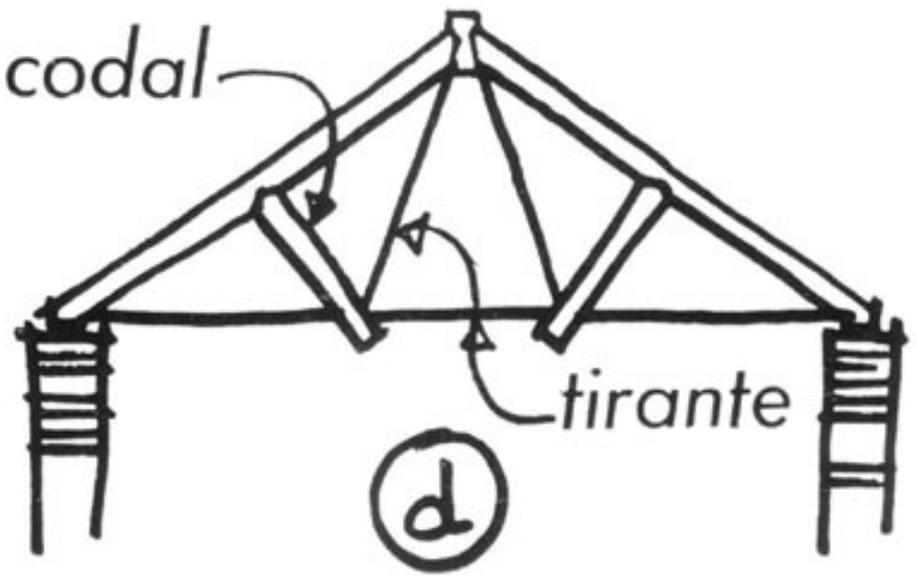
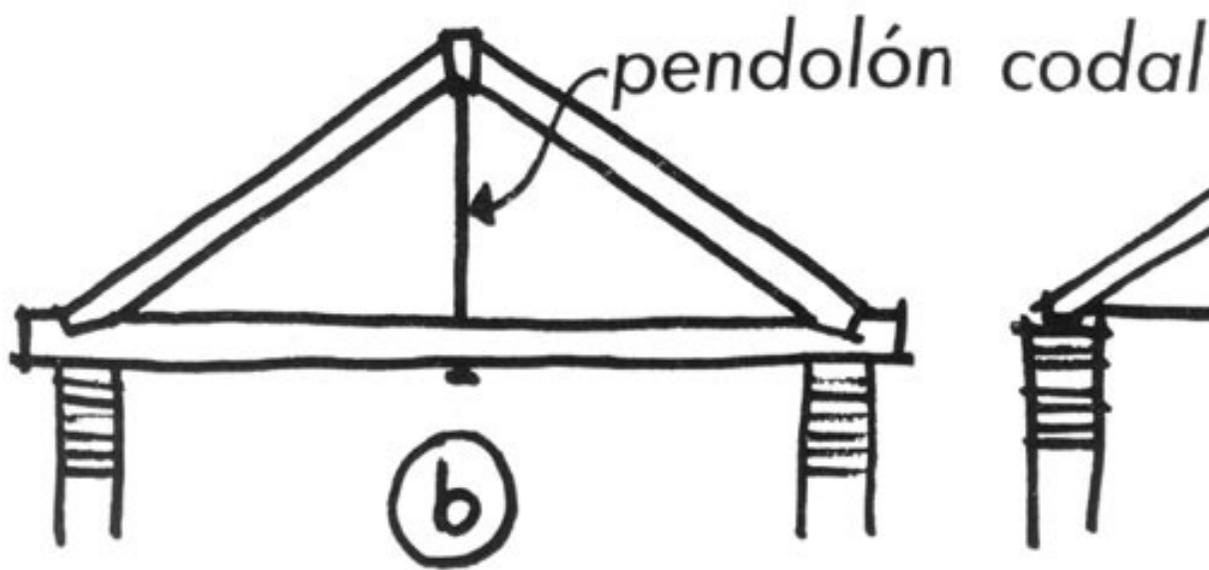
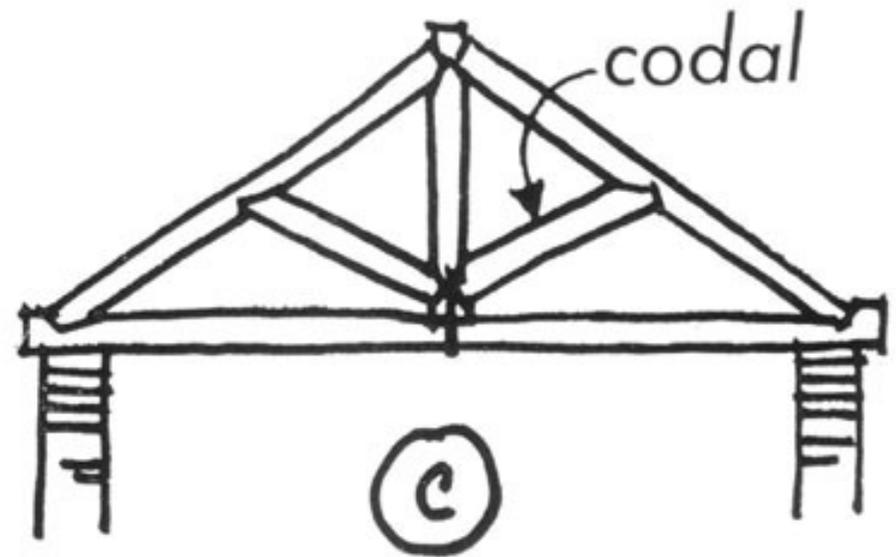
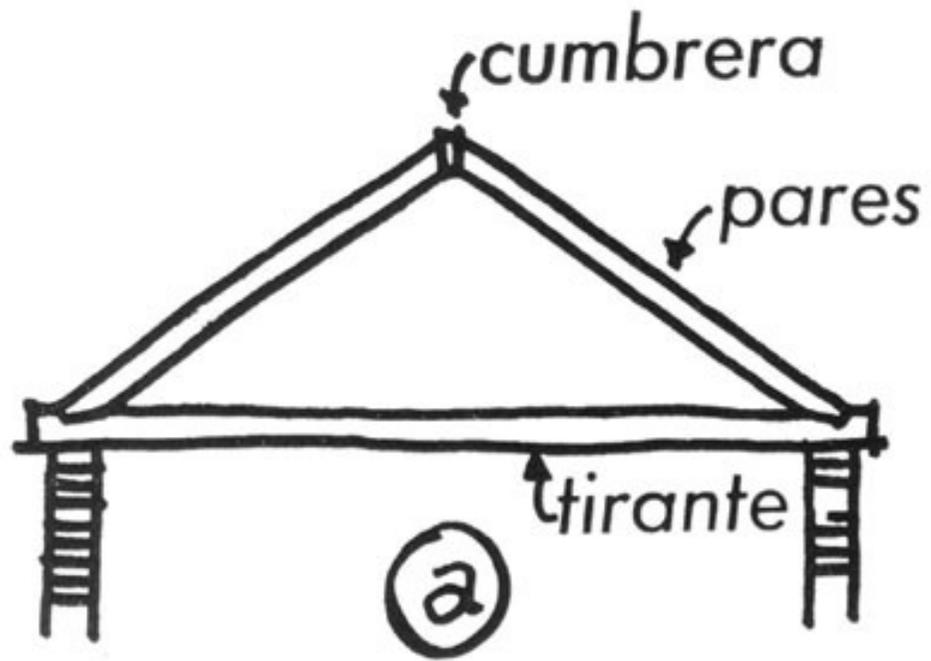
Equilibrio de conjunto













MÉTODOS DE ANÁLISIS DE LOS ESFUERZOS INTERNOS

MÉTODOS NODALES

MÉTODO DE LOS NUDOS

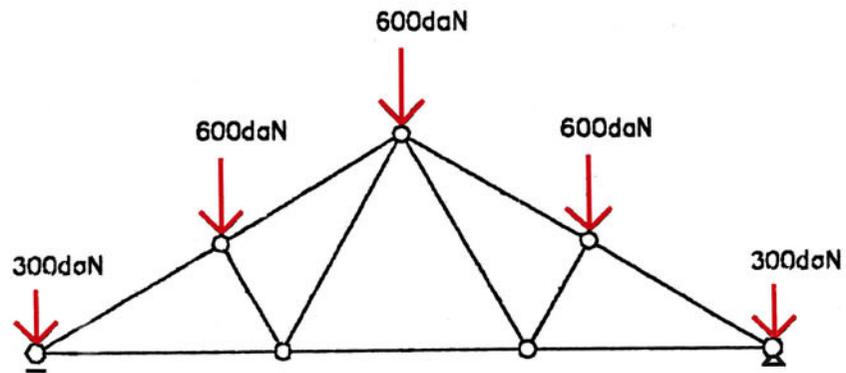
MÉTODO DE CREMONA

DE LAS SECCIONES

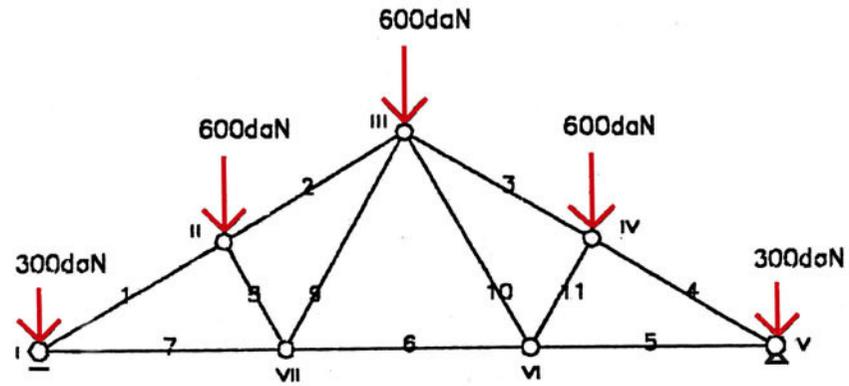
MÉTODO GRÁFICO

MÉTODO ANALÍTICO

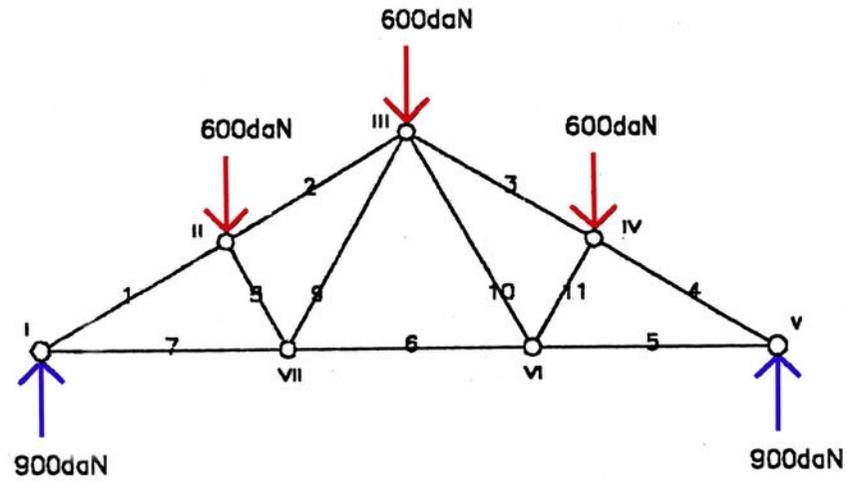
MÉTODO DE LOS NUDOS



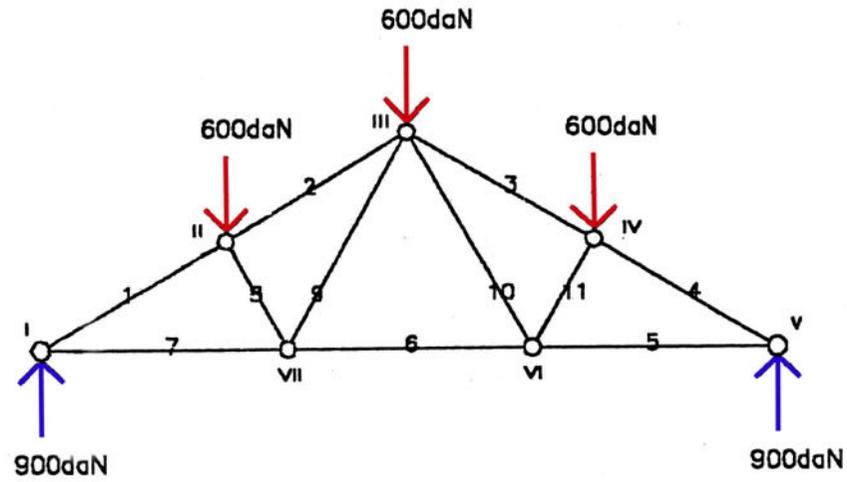
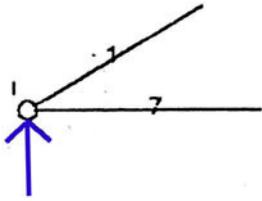
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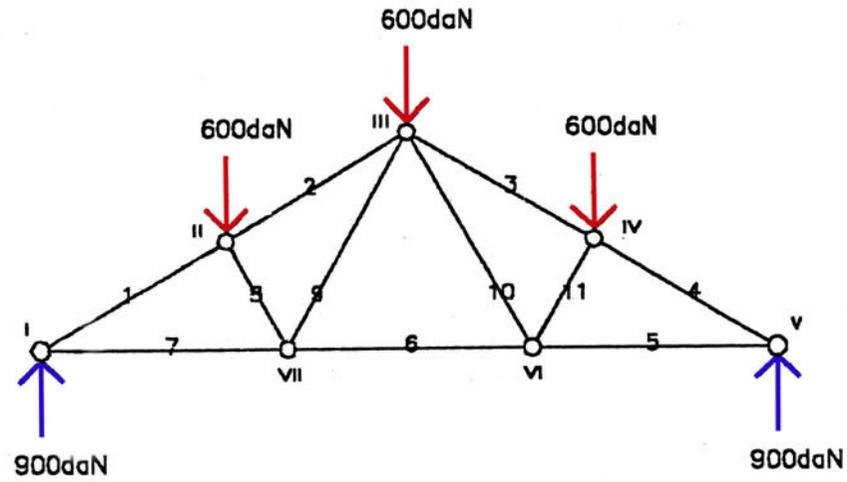
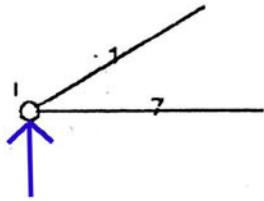
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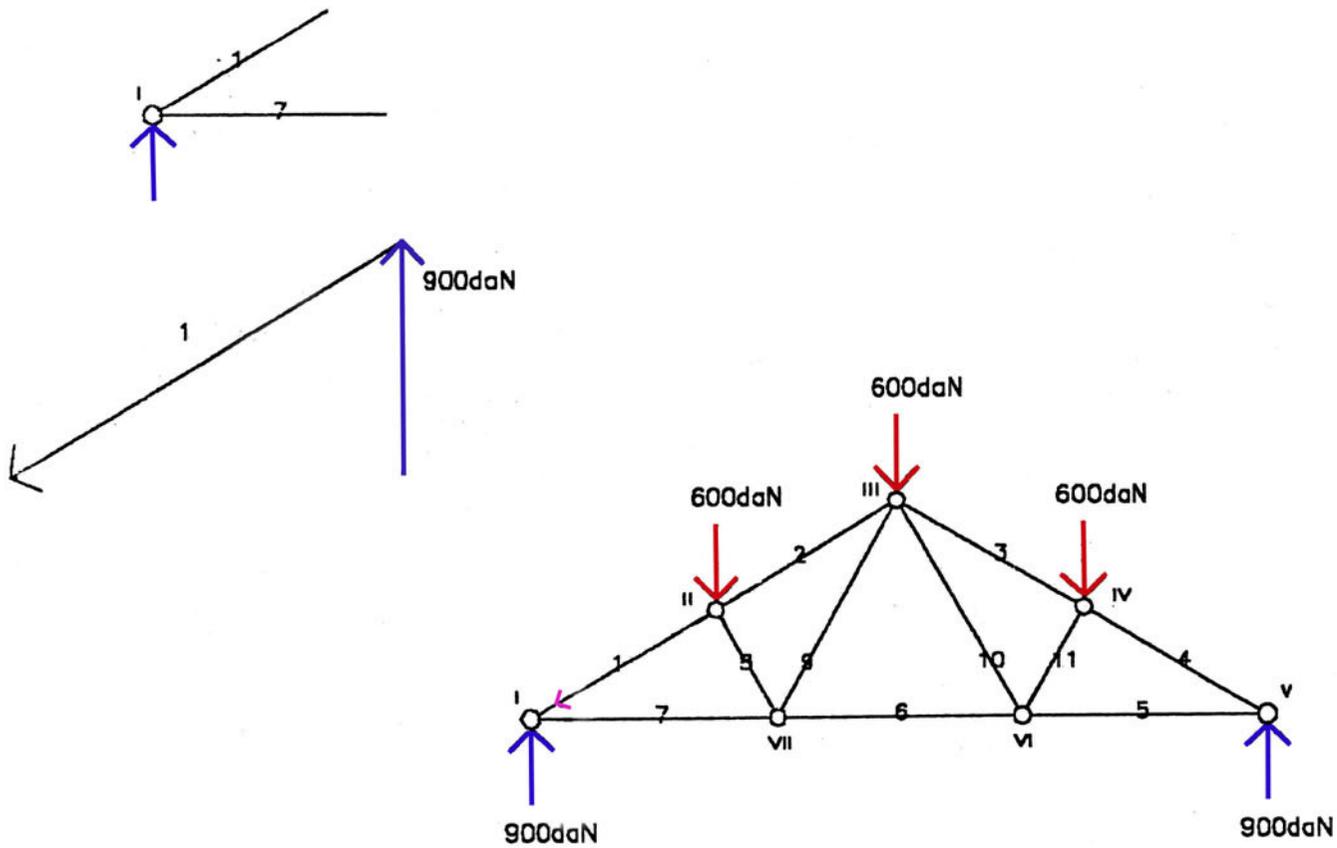
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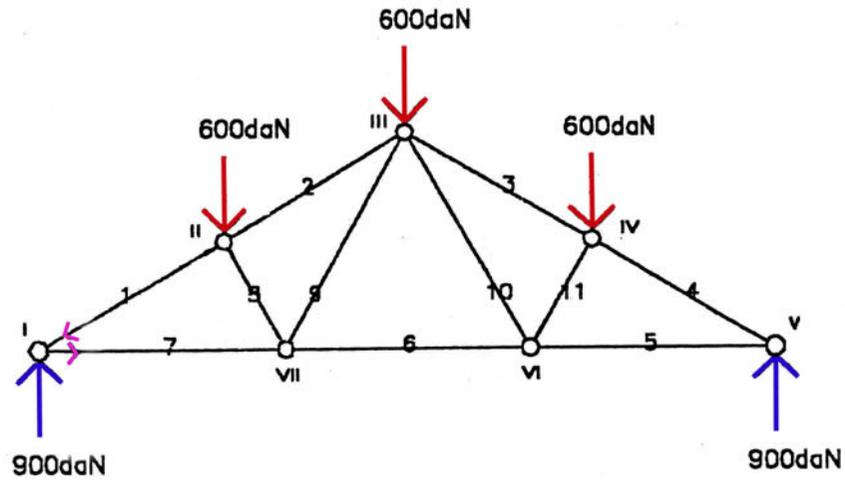
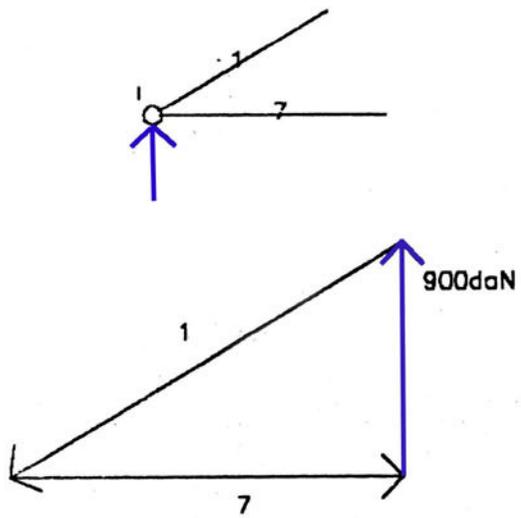
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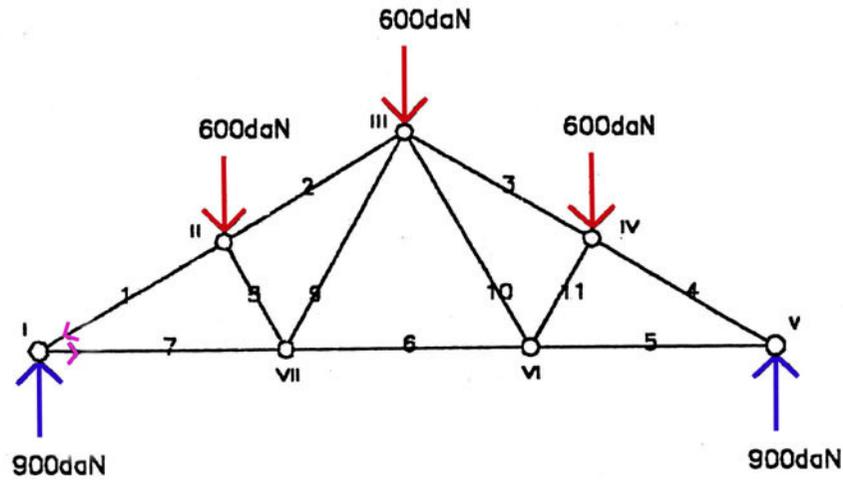
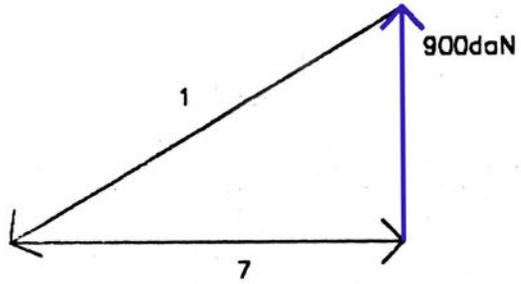
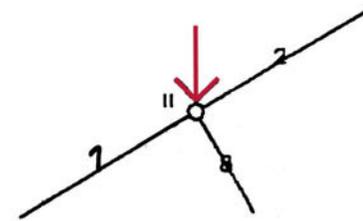
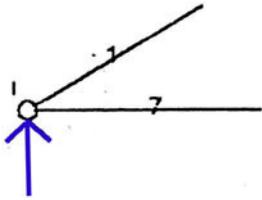
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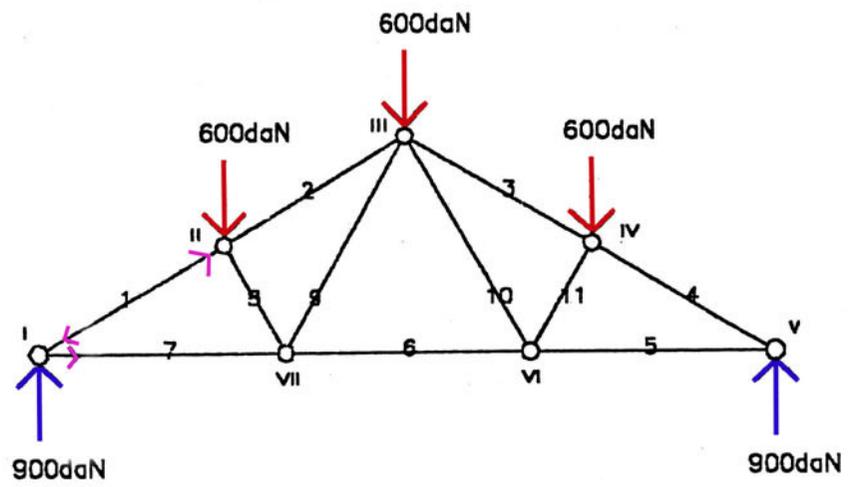
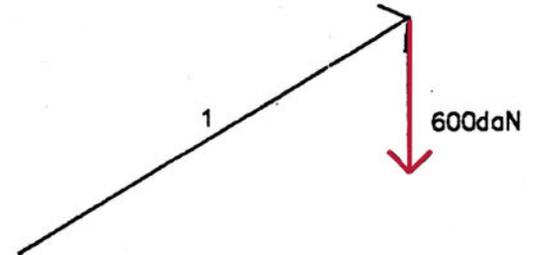
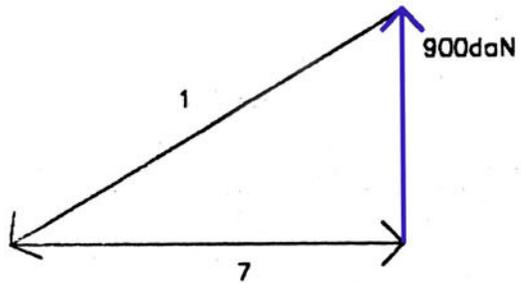
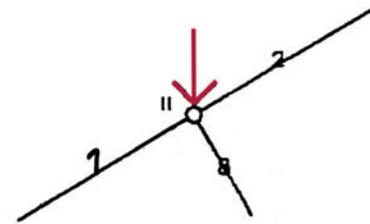
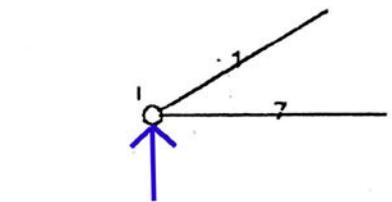
MÉTODO DE LOS NUDOS



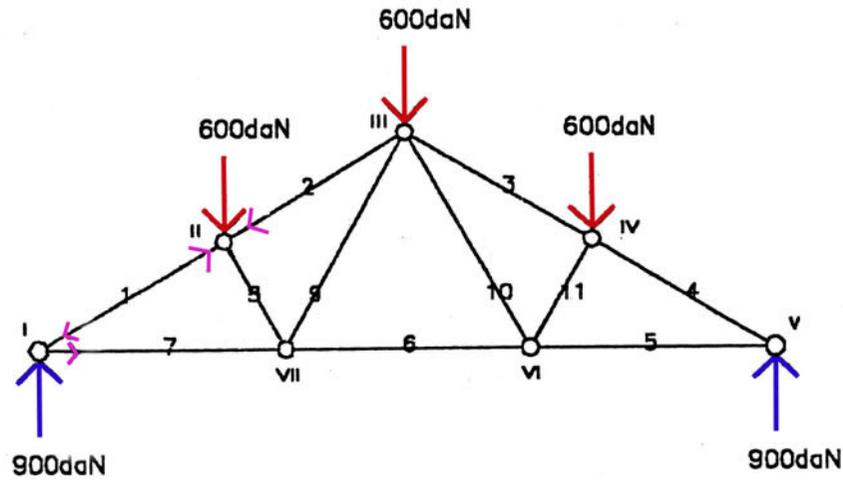
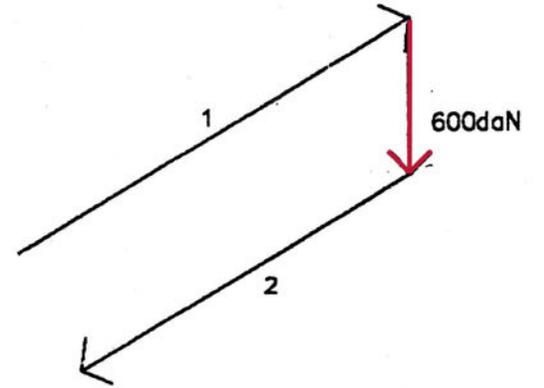
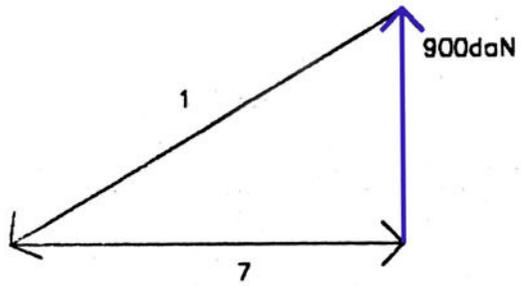
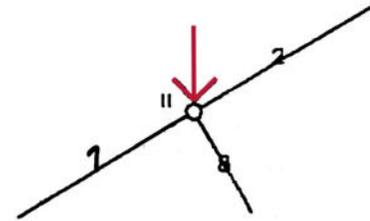
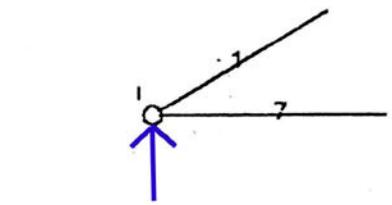
MÉTODO DE LOS NUDOS



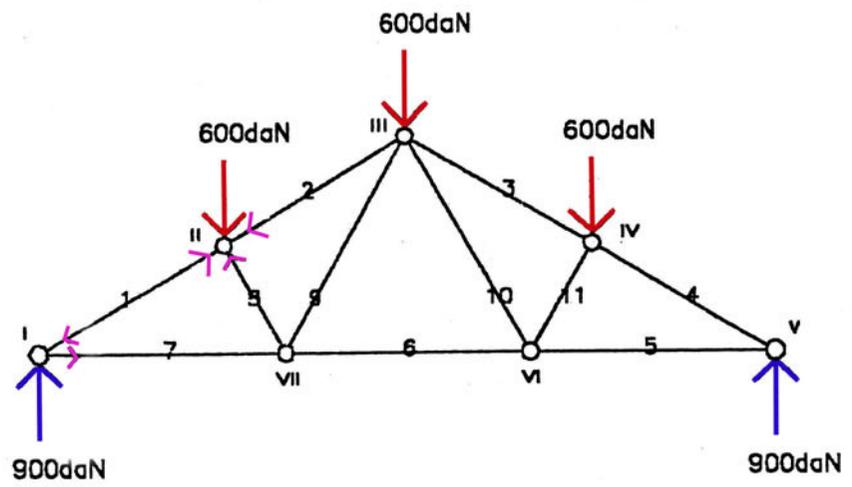
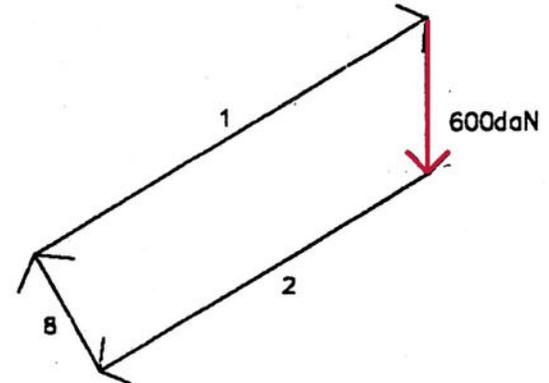
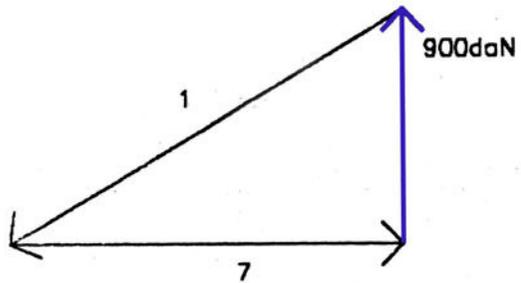
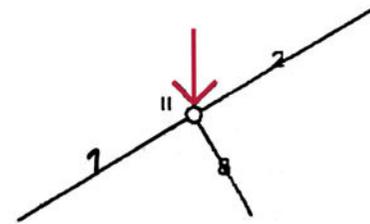
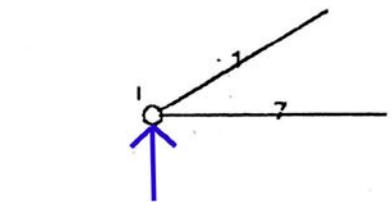
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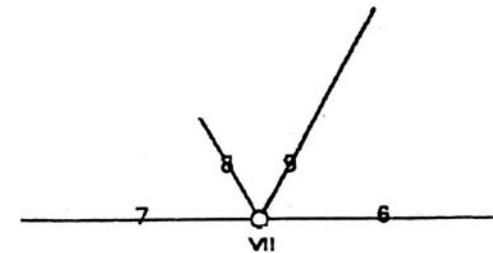
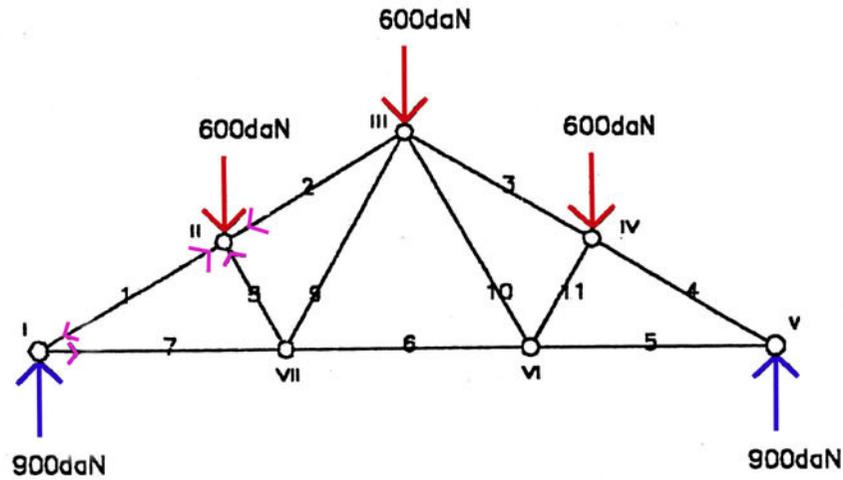
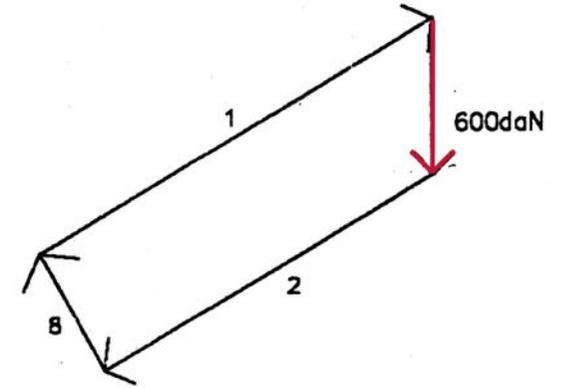
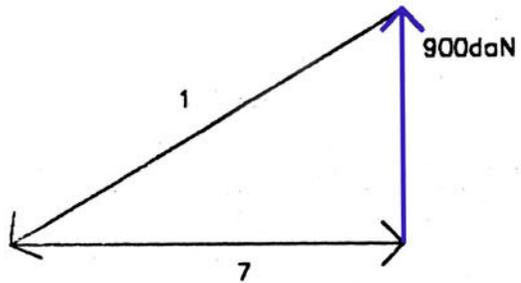
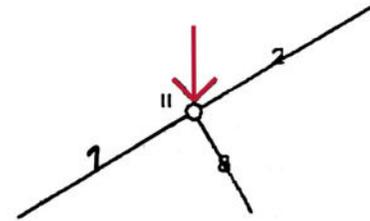
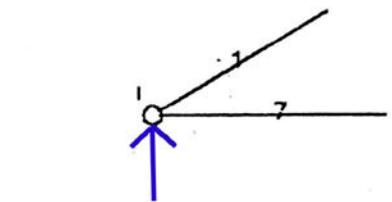
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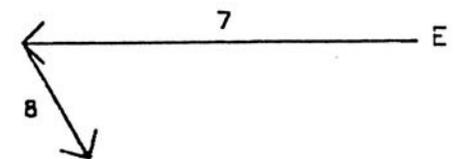
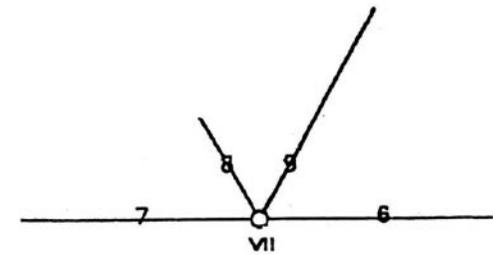
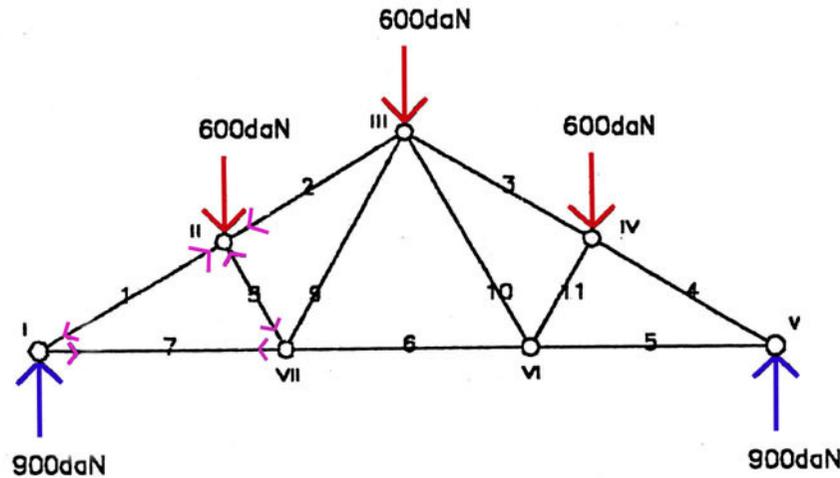
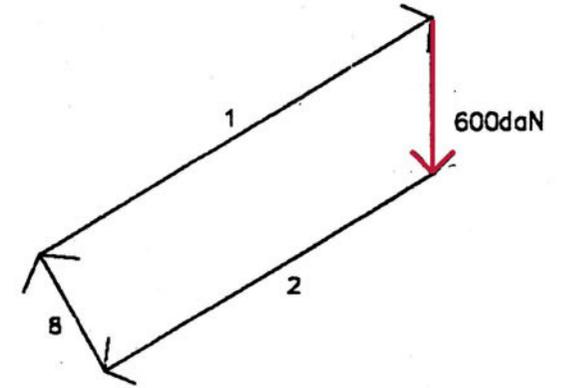
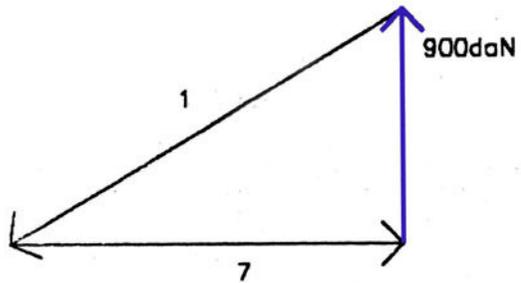
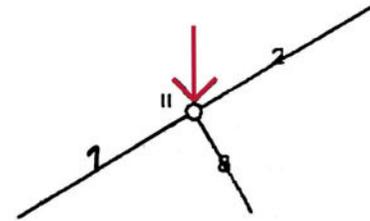
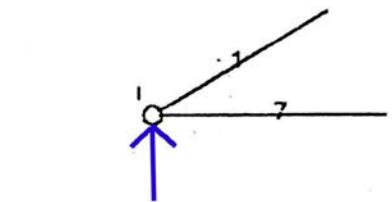
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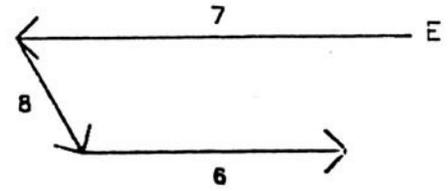
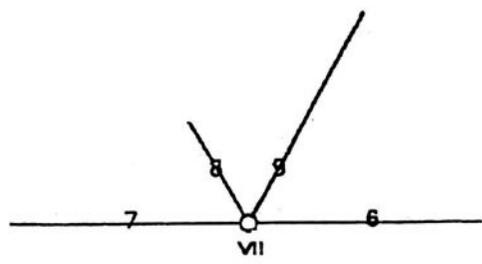
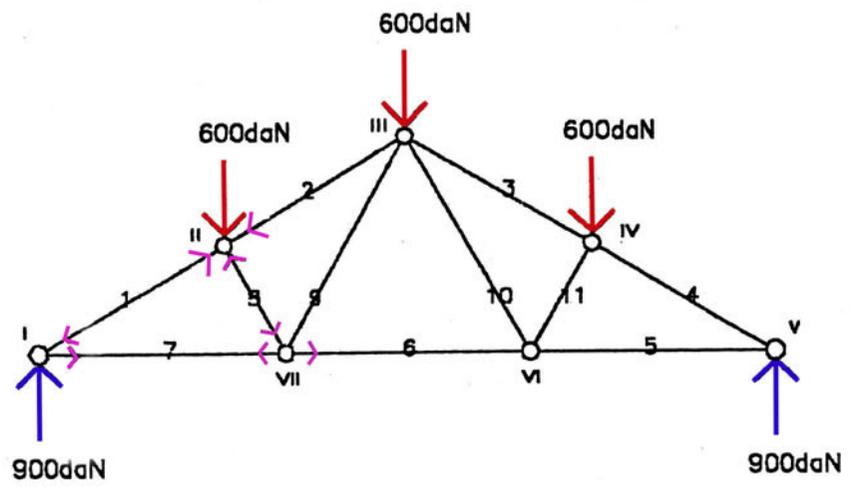
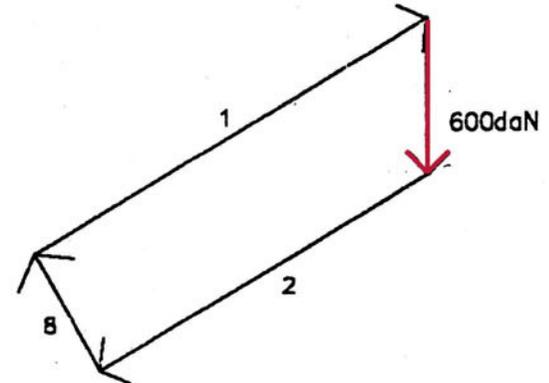
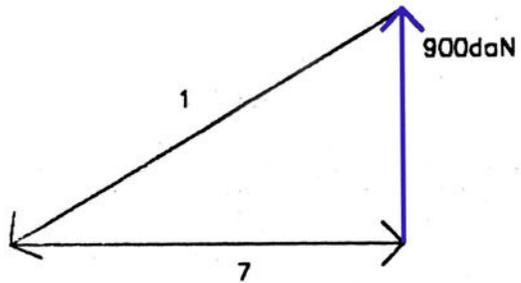
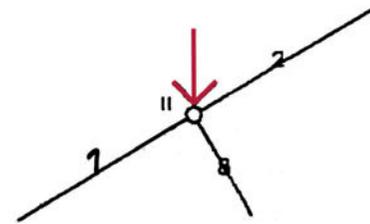
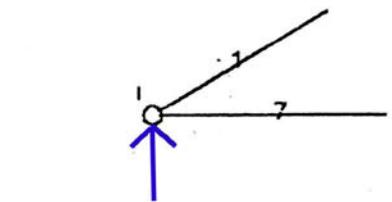
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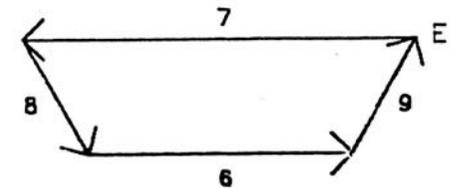
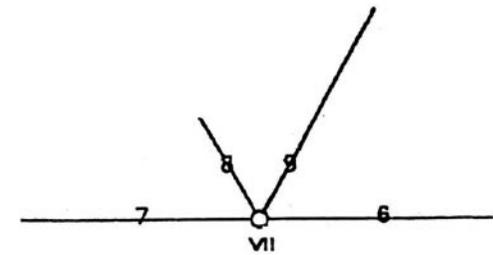
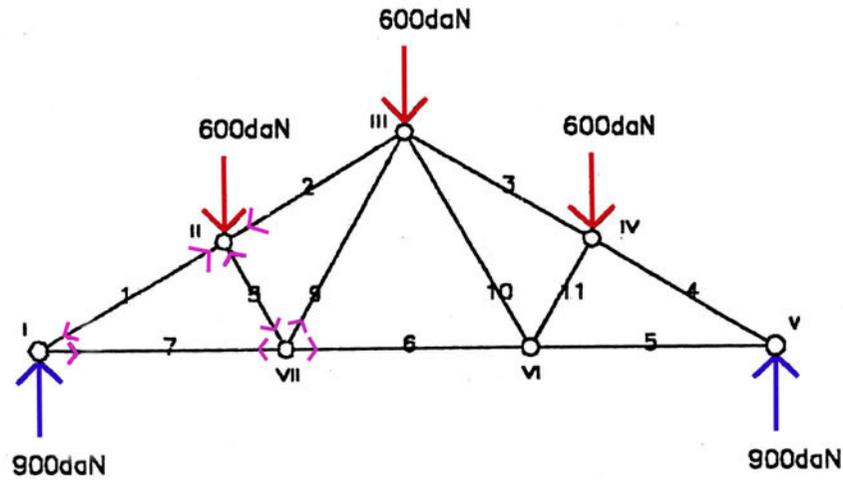
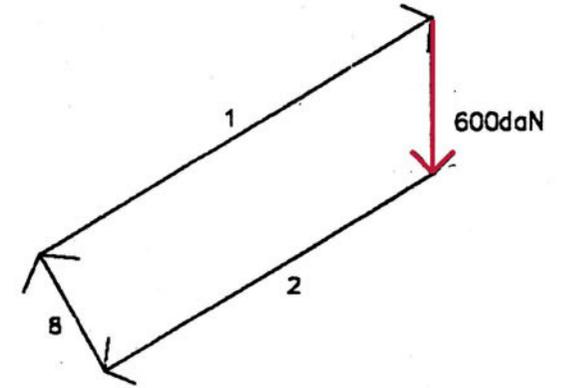
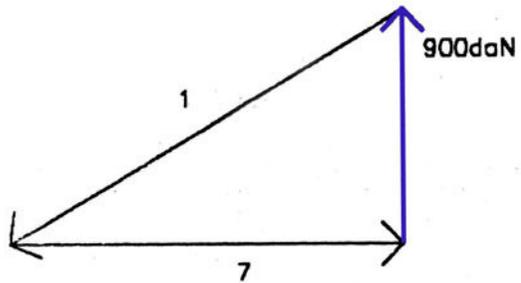
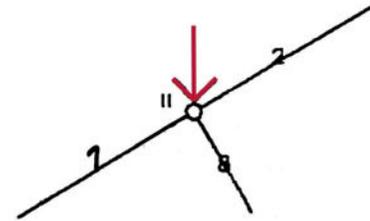
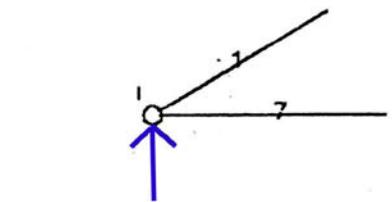
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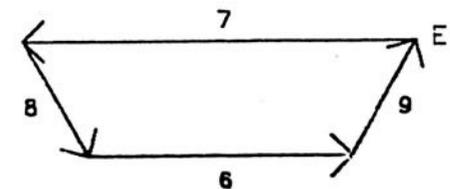
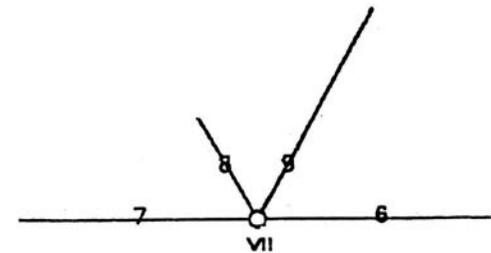
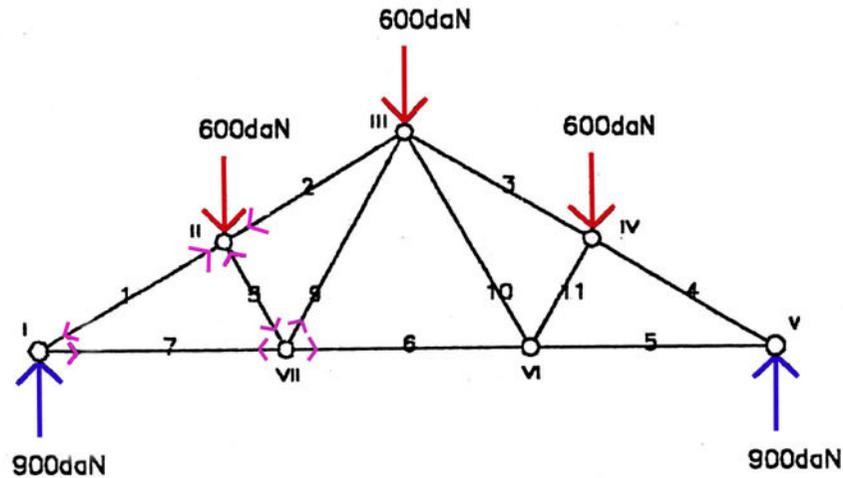
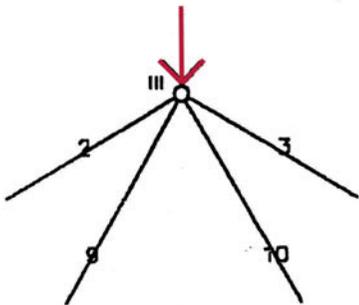
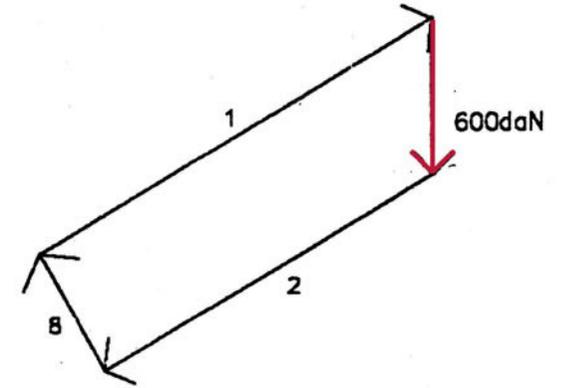
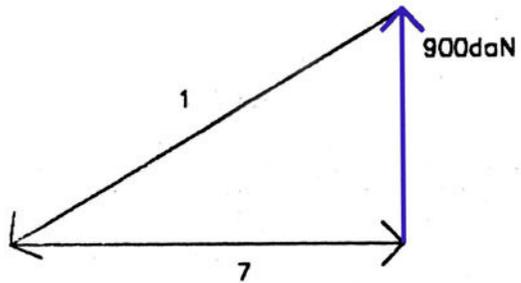
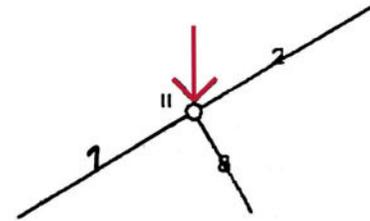
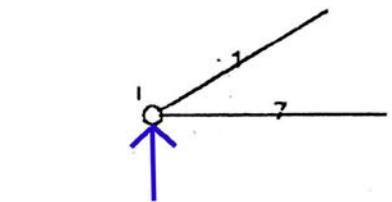
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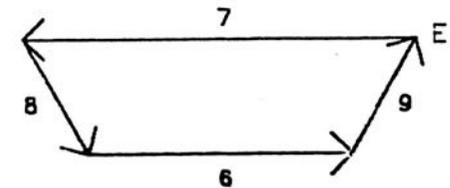
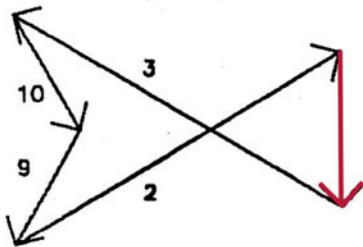
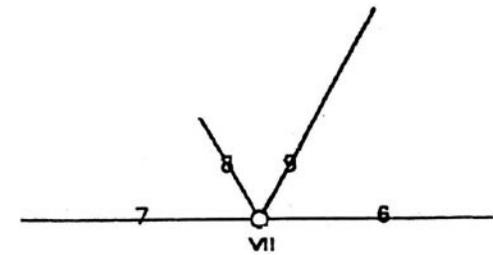
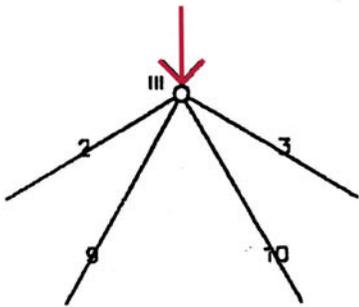
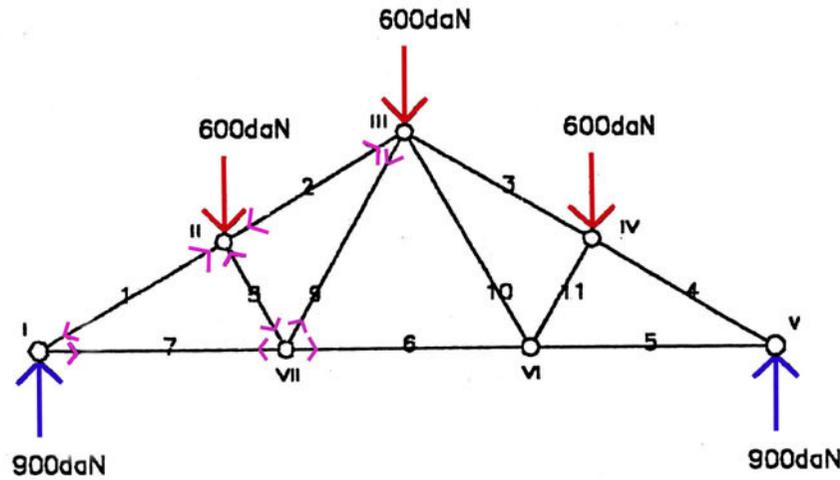
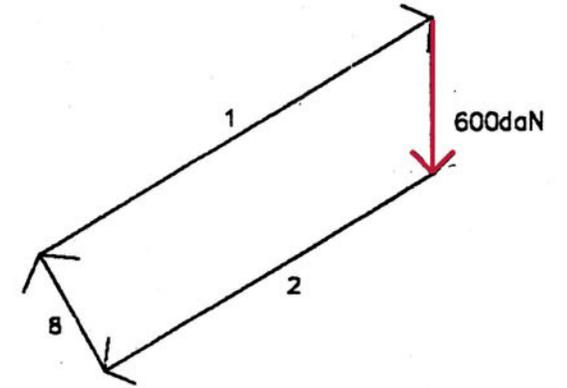
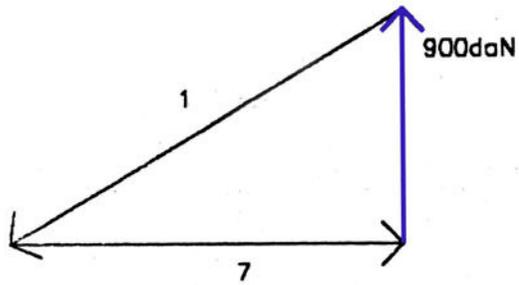
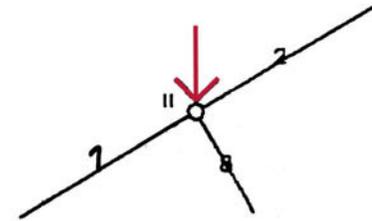
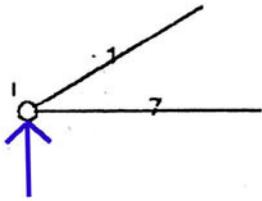
MÉTODO DE LOS NUDOS



MÉTODO DE LOS NUDOS



MÉTODO DE LOS NUDOS



MÉTODO DE LOS NUDOS

BARRA	COMPRESION	TRACCION	LONGITUD	SECCION	σ_{real}	σ_d EULER
1	1800 daN		260cm			
2	1500 daN		290cm			
3	1500 daN		290cm			
4	1800 daN		260cm			
5		1558 daN	300cm			
6		1039 daN	300cm			
7		1558 daN	300cm			
8	519 daN		150cm			
9		519 daN	260cm			
10		519 daN	260cm			
11	519 daN		150cm			

