

ESTRUCTURAS I

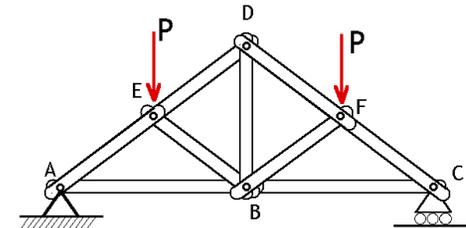
CURSO
ESTRUCTURAS I

CLASE 5 ESTRUCTURAS A BASE DE BARRAS ARTICULADAS ARMADURAS

■ Profesor: Jing Chang Lou

ESTRUCTURAS A BASE DE BARRAS ARTICULADAS ARMADURAS

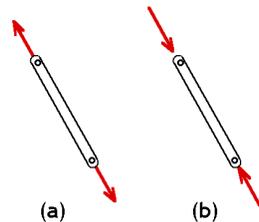
Son aquellas estructuras compuestas por medio de piezas rectas, sólidas y esbeltas, convenientemente vinculadas entre sí de tal manera que cualquier forma posible resulte de la combinación de sistemas triangulados.



ESTRUCTURAS A BASE DE BARRAS ARTICULADAS ARMADURAS

Constan de elementos rectos conectados en nudos localizados en los extremos de los elementos

Los elementos de estas estructuras están sometidos a dos fuerzas iguales y opuestas dirigidas a lo largo del elemento



ESTRUCTURAS A BASE DE BARRAS ARTICULADAS ARMADURAS

CLASIFICACION

- VIGA DE CELOSIA O RETICULADA
- CERCHAS
- ARCOS Y PORTICOS
- MENSULAS O MARQUESINAS

ESTRUCTURAS I



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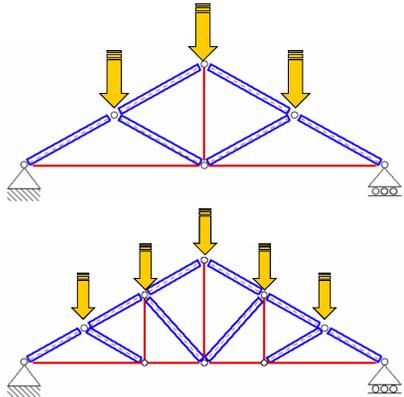


EDIFICIOS EN ALTURA

This slide features a collage of four photographs of modern high-rise buildings. The top-left image shows a tall, slender tower with a white truss-like exterior. The top-right image shows a building with a complex, multi-faceted truss structure. The bottom-left image shows a building with a curved, glass facade. The bottom-right image shows a building under construction with a prominent orange truss structure.

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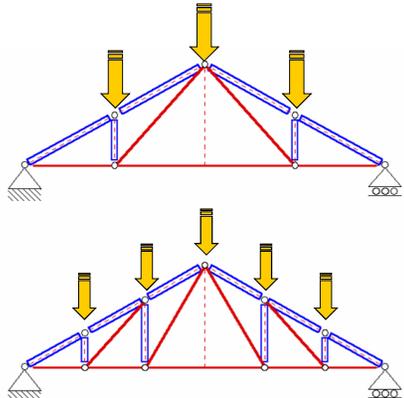
EJEMPLOS: TRACCION Y COMPRESION EN LAS BARRAS



This slide contains two diagrams of a truss structure. The top diagram shows a simple truss with three members meeting at a central top node and two nodes at the base. Yellow arrows point downwards at the top nodes, representing a load. The bottom diagram shows a more complex truss with five members meeting at a central top node and four nodes at the base. Yellow arrows point downwards at the top nodes, representing a load. The truss members are colored blue and red, indicating tension and compression respectively.

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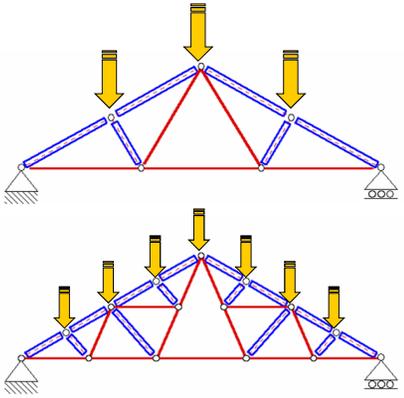
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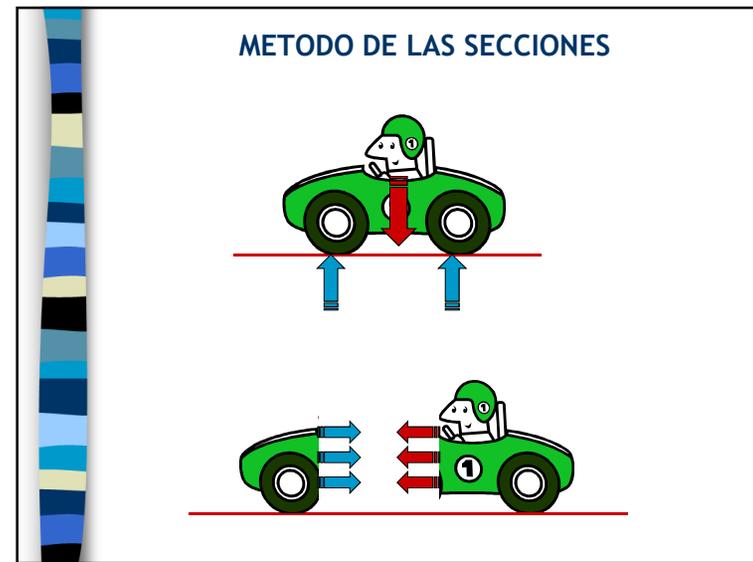
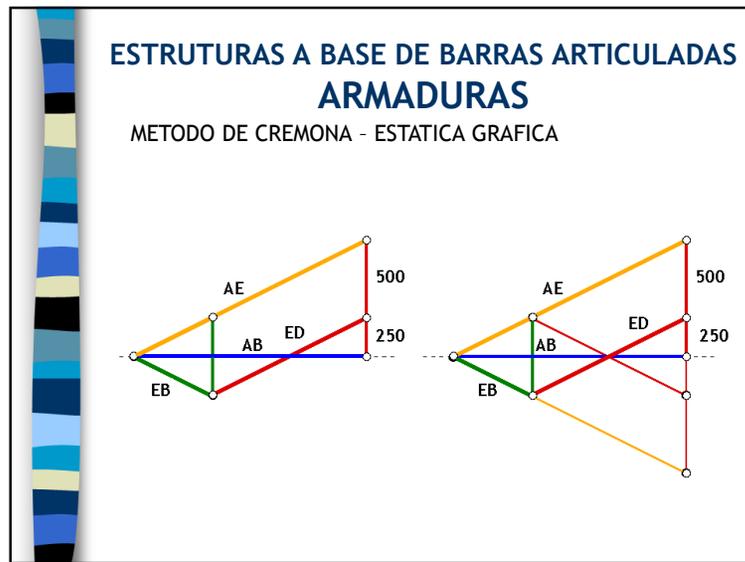
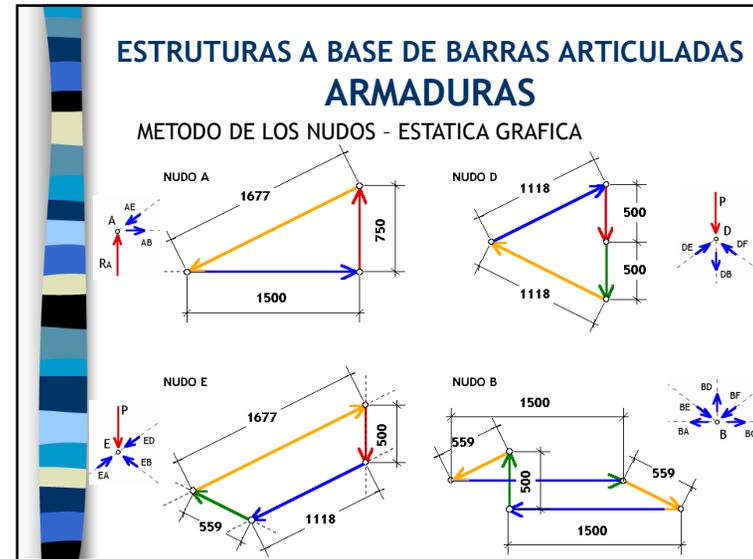
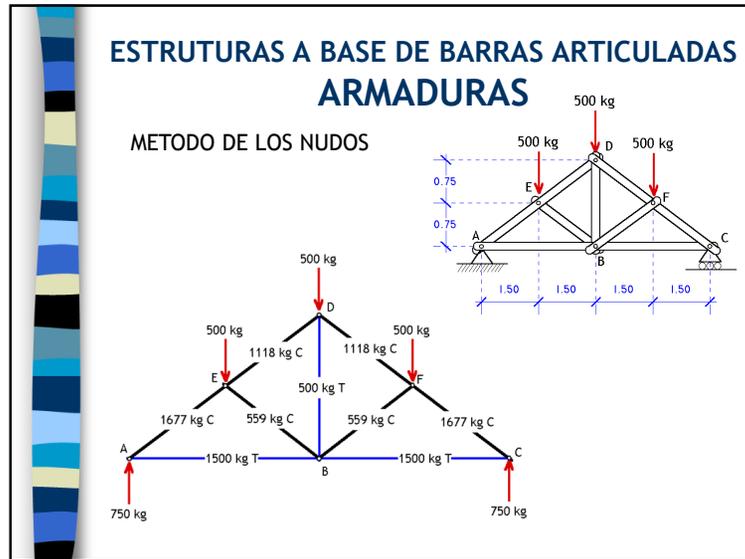
METODO DE ANALISIS

- METODO DE LOS NUDOS
- METODO DE RITTER O DE LAS SECCIONES
- METODO DE CREMONA

ESTRUTURAS A BASE DE BARRAS ARTICULADAS ARMADURAS

METODO DE LOS NUDOS

ESTRUCTURAS I



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METODO DE LAS SECCIONES

SECCION 1

Diagram showing a truss structure with a section cut through members DE and EF. The left part shows the full truss with a 500 kg load at D. The right part shows the sectioned part with internal forces at E and F.

METODO DE LAS SECCIONES

SECCION 1

$$\sum M_E = 0$$

$$750\text{kg} \cdot 1,5\text{m} - \overline{AB} \cdot 0,75\text{m} = 0$$

$$\overline{AB} = \frac{750\text{kg} \cdot 1,5\text{m}}{0,75\text{m}}$$

$$\overline{AB} = 1500\text{ kg}$$

Diagram showing the truss section with a 500 kg load at D. The section cut is through member AB. The reaction at A is R_a and at B is \overline{AB} .

METODO DE LAS SECCIONES

SECCION 1

$$\frac{d_1}{\text{sen}26,56^\circ} = \frac{3\text{m}}{\text{sen}90^\circ}$$

$$d_1 = 1,34$$

$$\sum M_B = 0$$

$$750\text{kg} \cdot 3\text{m} - 500\text{kg} \cdot 1,5\text{m} - \overline{ED} \cdot d_1 = 0$$

$$2250\text{kgm} - 750\text{kgm} - \overline{ED} \cdot d_1$$

$$\overline{ED} = \frac{1500\text{kgm}}{d_1}$$

$$\overline{ED} = \frac{1500\text{kgm}}{1,34\text{m}}$$

$$\overline{ED} = 1119,40\text{kg}$$

Diagram showing the truss section with a 500 kg load at D. The section cut is through member ED. The reaction at A is R_a and at B is \overline{AB} . The distance d_1 is the perpendicular distance from B to the line of action of ED.

METODO DE LAS SECCIONES

SECCION 1

$$\frac{d_2}{\text{sen}26,56^\circ} = \frac{3\text{m}}{\text{sen}90^\circ}$$

$$d_2 = 1,34$$

$$\sum M_A = 0$$

$$500\text{kg} \cdot 1,5\text{m} - \overline{EB} \cdot d_2 = 0$$

$$750\text{kgm} - \overline{EB} \cdot d_2 = 0$$

$$\overline{EB} = \frac{750\text{kgm}}{d_2}$$

$$\overline{EB} = \frac{750\text{kgm}}{1,34\text{m}}$$

$$\overline{EB} = 599,70\text{kg}$$

Diagram showing the truss section with a 500 kg load at D. The section cut is through member EB. The reaction at A is R_a and at B is \overline{AB} . The distance d_2 is the perpendicular distance from A to the line of action of EB.

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METODO DE LAS SECCIONES

SECCION 2

METODO DE LAS SECCIONES

SECCION 2

$$\frac{d_1}{\sin 26,56^\circ} = \frac{3m}{\sin 90^\circ}$$

$$d_1 = 1,34$$

$$\sum M_B = 0$$

$$750\text{kg} * 3\text{m} - \overline{AE} * d_1 = 0$$

$$\overline{AE} = \frac{2250\text{kg}}{1,34\text{m}}$$

$$\overline{AE} = 1679,10\text{kg}$$

METODO DE LAS SECCIONES

SECCION 3

METODO DE LAS SECCIONES

SECCION 3

$$\frac{d_3}{\sin 26,56^\circ} = \frac{3m}{\sin 90^\circ}$$

$$d_3 = 1,34$$

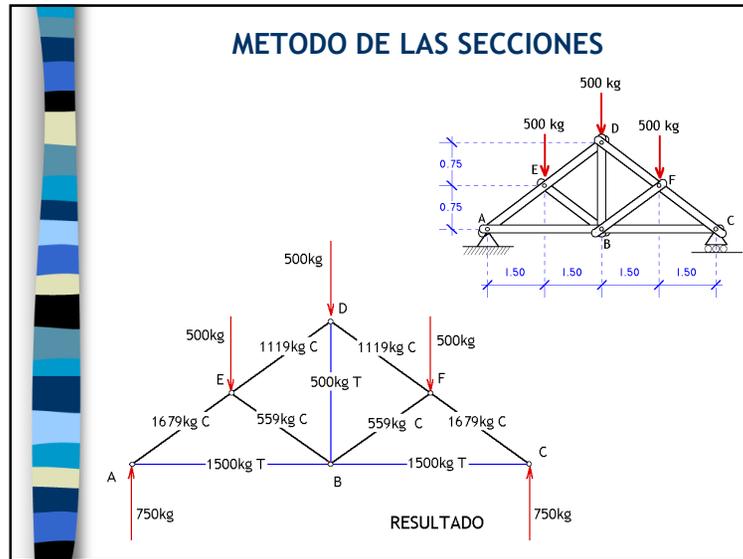
$$\sum M_C = 0$$

$$750\text{kg} * 6\text{m} - \overline{BE} * d_3 - 500\text{kg} * 4,5\text{m} - 500\text{kg} * 3\text{m} + \overline{BD} * 3\text{m} = 0$$

$$\overline{BD} = \frac{4500\text{kgm} + 803,59\text{kgm} - 2250\text{kgm} + 1500\text{kgm}}{1,34\text{m}}$$

$$\overline{BD} = -500\text{kg}$$

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