SEM0104 - Aula 1

Introdução e Motivação

Prof. Dr. Marcelo Becker

SEM - EESC - USP

Sumário da Aula

- **Informações sobre o Curso**
- Introdução
- Histórico
- Exemplos de Aplicação

Informações sobre o Curso

- Aulas 4^{as} (8h – 10h) e 5^{as} (10h – 12h)
- Nota: $NF = \dfrac{P_1*3 + P_2*4 + Projetos*3}{10}$
- Datas da Provas:
  - P_1: 22/ABR/2015
  - P_2: 17/JUN/2015
  - Competição: 24/JUN/2015
  - Sub.: 01/JUL/2015 (apenas para quem faltou)

Informações sobre o Curso

Ementa do Curso

- As equações gerais de movimento e tipos de mecanismos.
- Mecanismos articulados.
- Métodos gráficos.
- Polígonos de velocidade e aceleração.
- Dinâmica de Mecanismos.
- Cames.
- Engrenagens cilíndricas com dentes com perfil de envolvente.
- Trens de engrenagens.
- Mecanismos planetários.

Informações sobre o Curso

Bibliografia Recomendada

- Shigley, JE. e Uicker, JJ., 1995, "*Theory of Machines and Mechanisms*".
- MABIE, H.H., OCVIRK, F.W. "Mecanismos e dinâmica das máquinas".
- MARTIN, G.H. "Cinematics and dynamics of machines".
- NORTON, R. L. "Design of Machinery - An Introduction to the Synthesis and Analysis of Mechanisms and Machines"
- Notas de Aula

Contato

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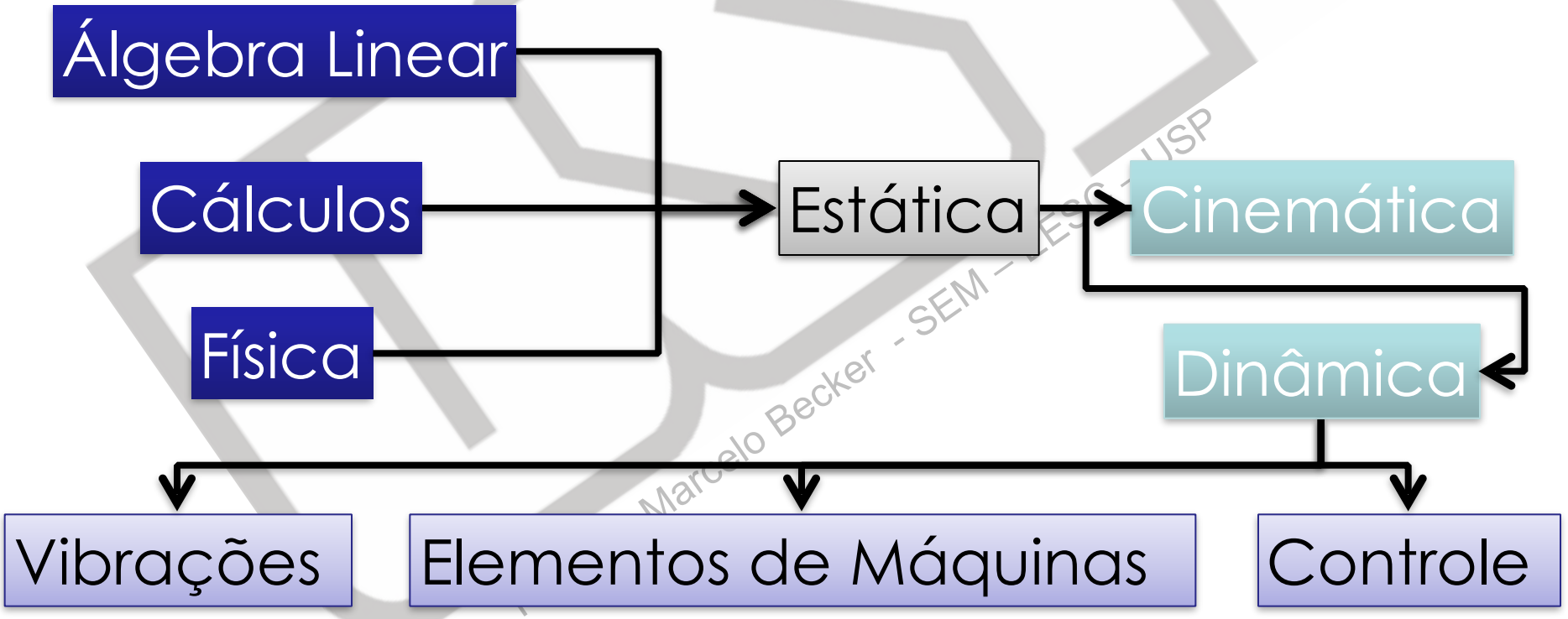
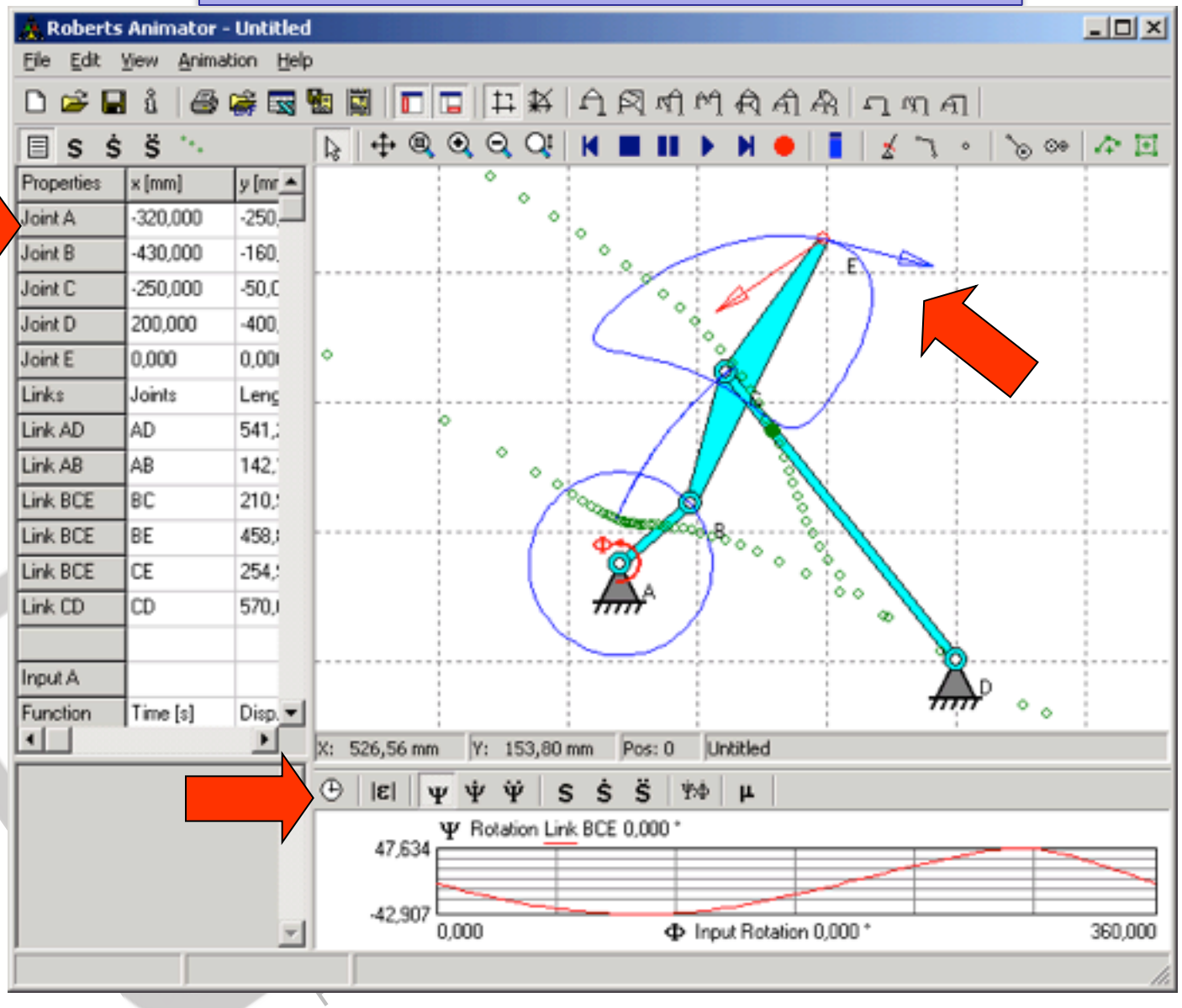
- **Introdução**
- Histórico
- Exemplos de Aplicação

Introdução e Motivação

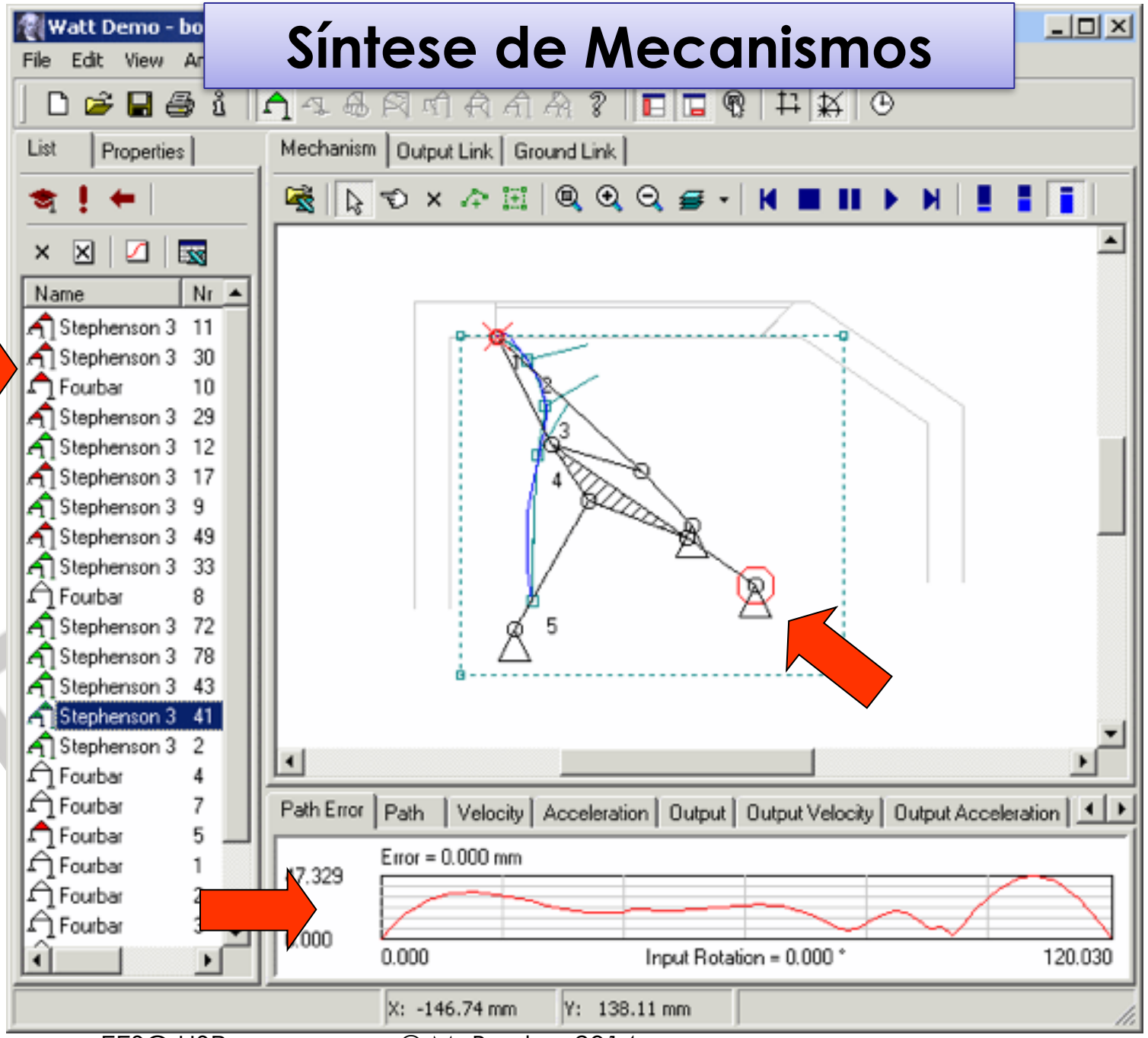
- Pergunta: O porquê de se estudar mecanismos?



Análise de Mecanismos



Síntese de Mecanismos



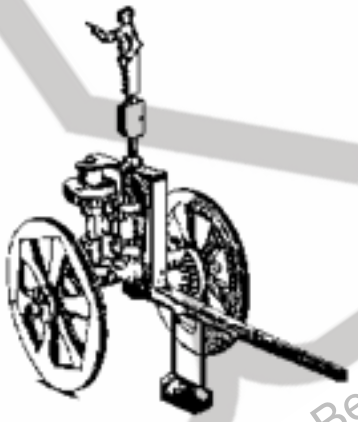
Sumário da Aula

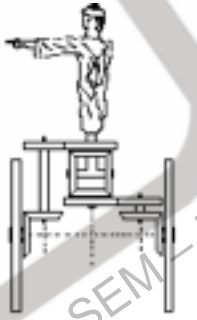
- Informações sobre o Curso
- Introdução
- **Histórico**
- Exemplos de Aplicação

Histórico

Carroça Chinesa (2.634 a.C.)

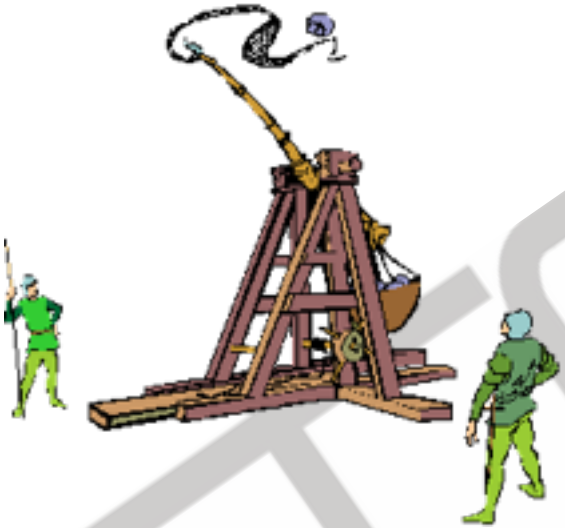
Imperador Huang Di (China)

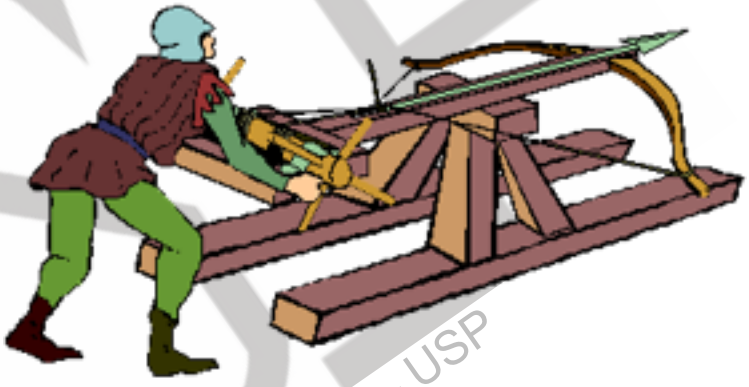


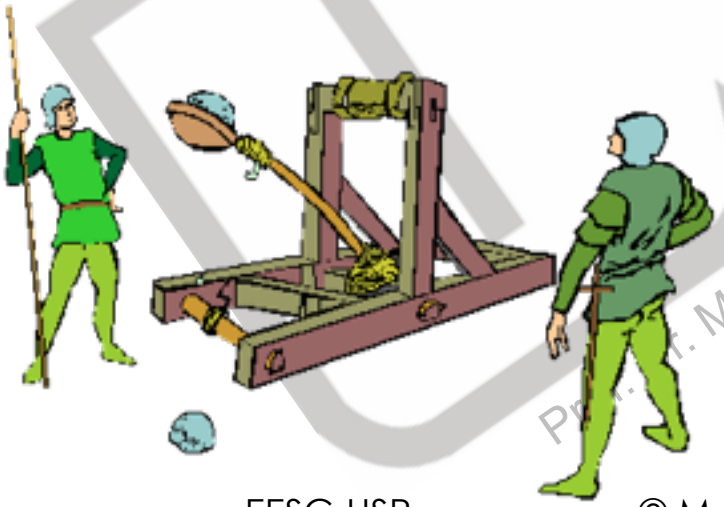


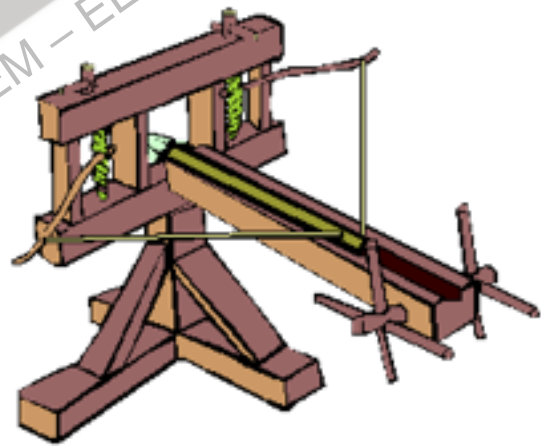
Histórico

Armas





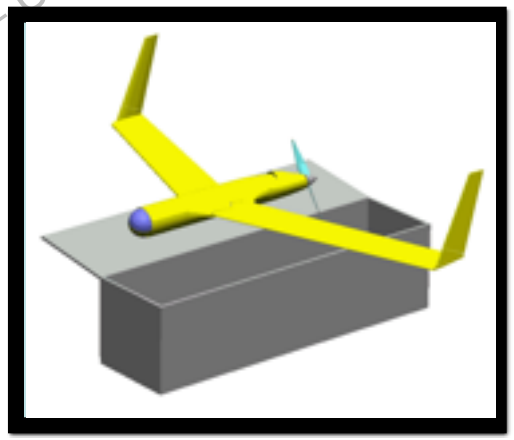




Histórico

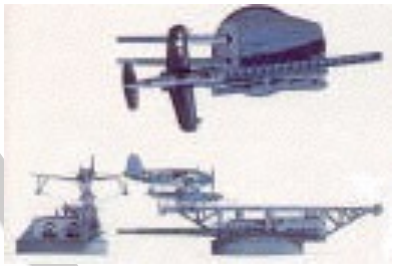
Catapultas 'Modernas'

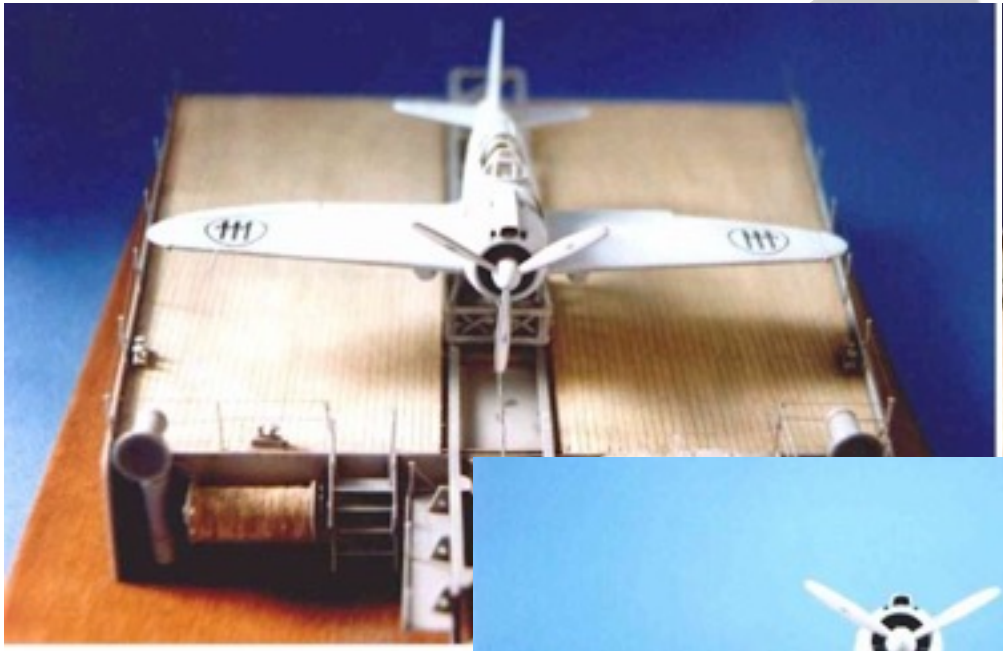
Aeromodelos
e
Planadores

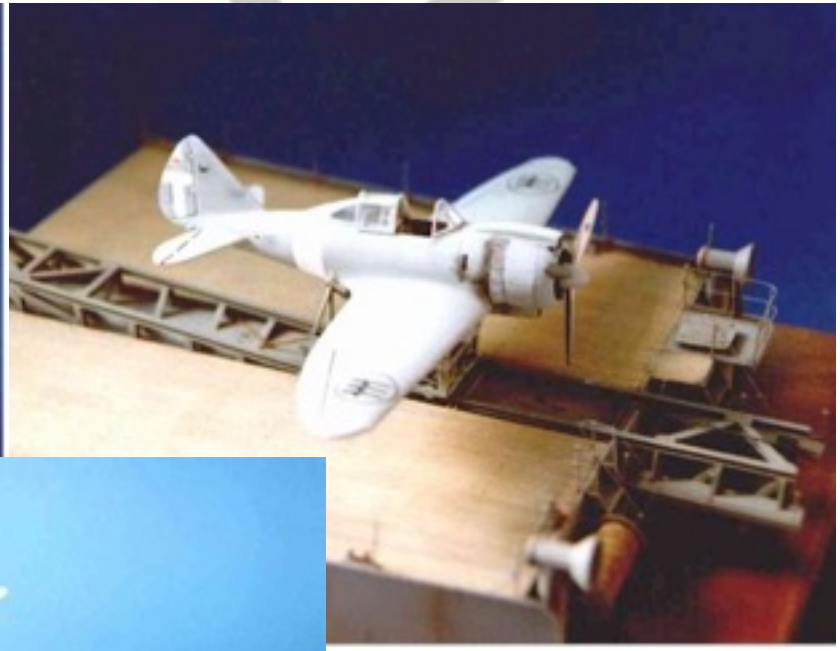


Histórico

Catapultas 'Modernas'







Histórico

Catapultas 'Modernas'

Histórico

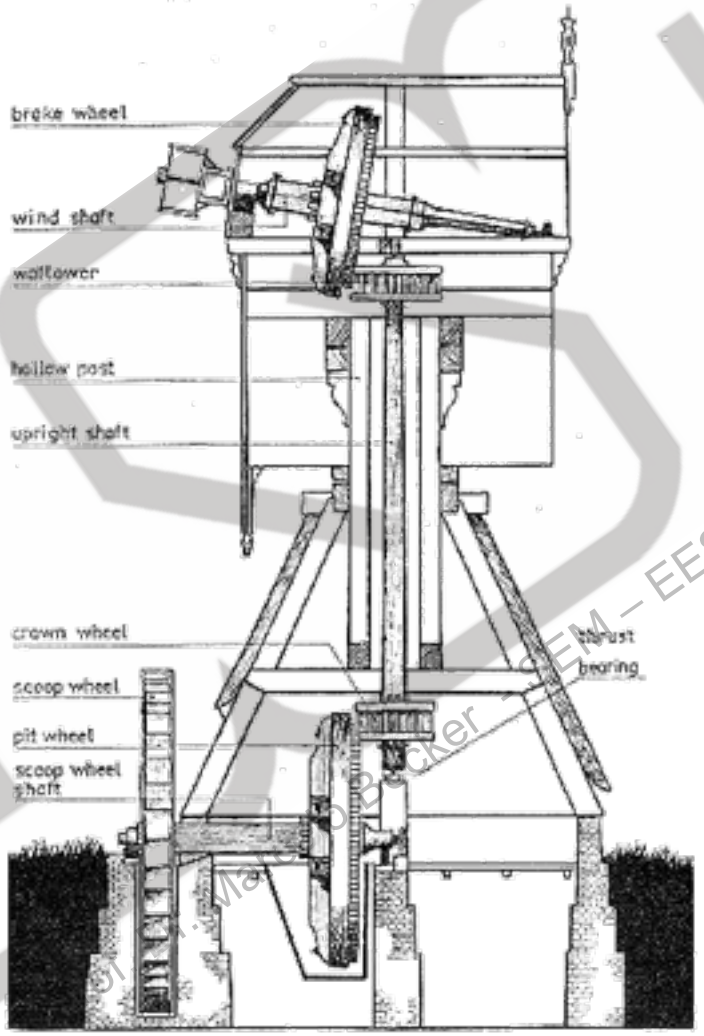
Catapultas 'Modernas'

Histórico
Armas

Cel. Samuel Colt
(*1814 + 1862)

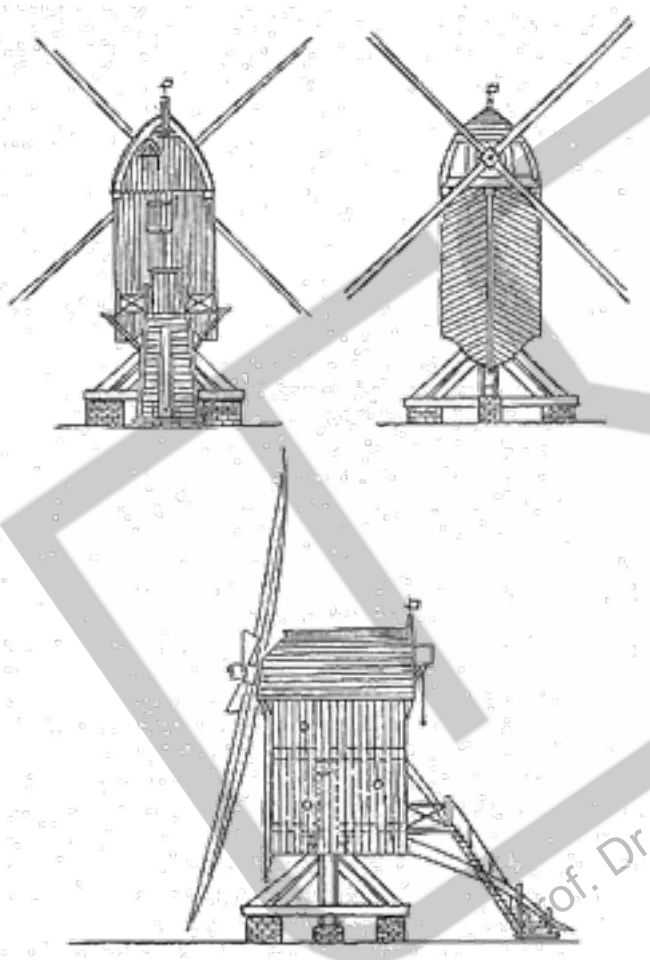
Peças Intercambiáveis

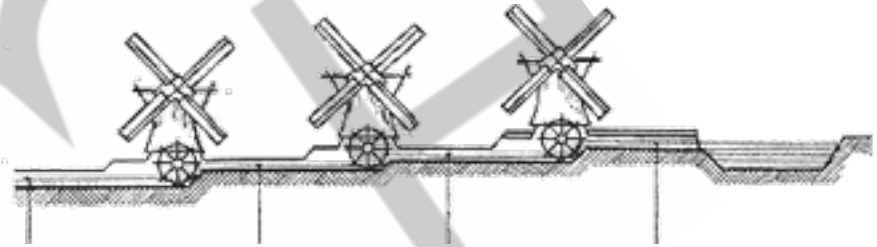
Histórico
Moinhos de Vento

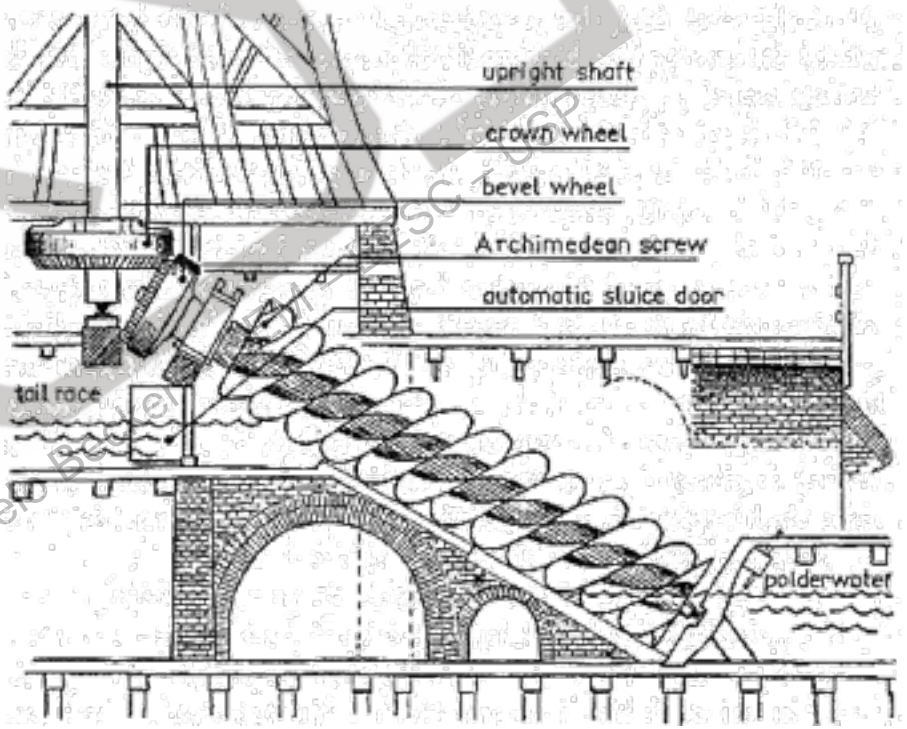


Histórico
Moinho de Vento

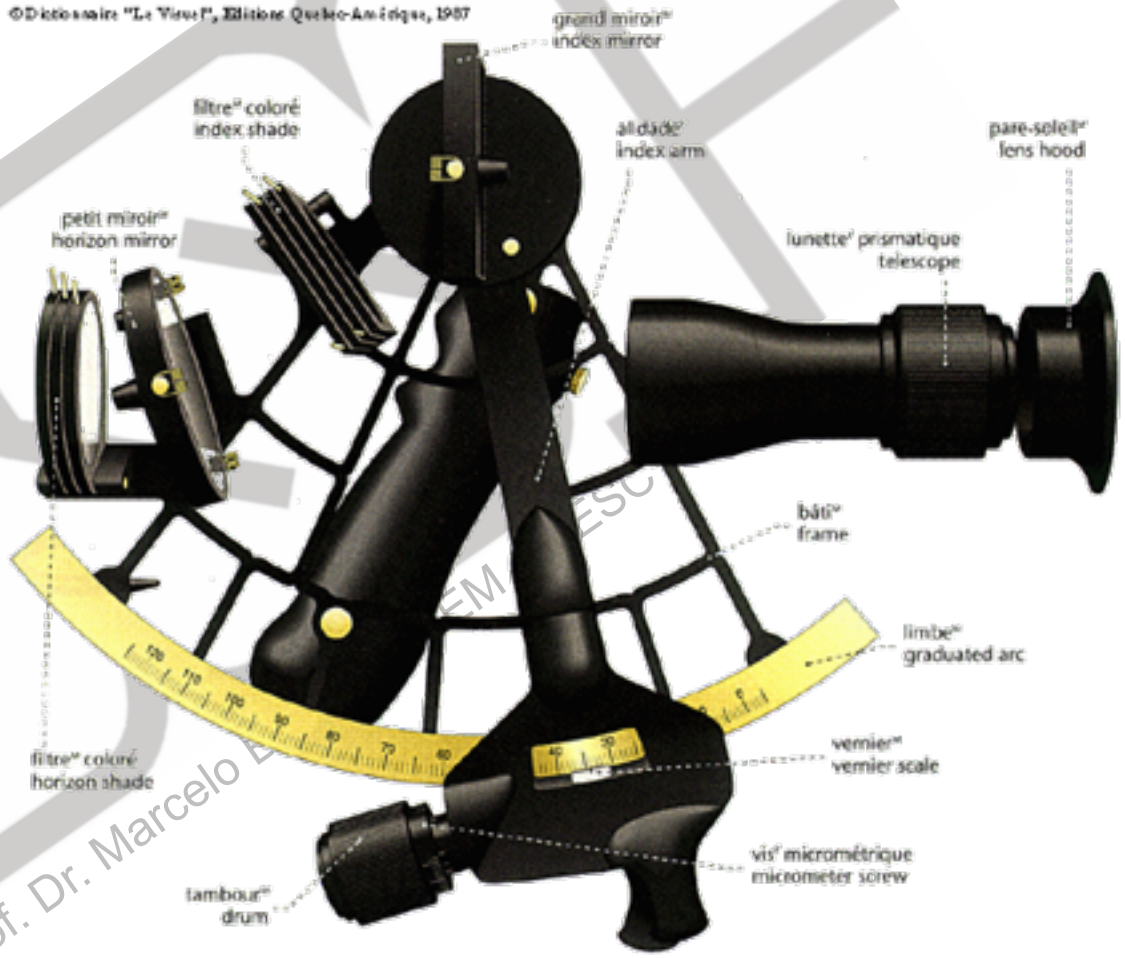






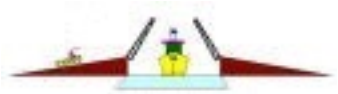


Histórico
Instrumentos de Navegação

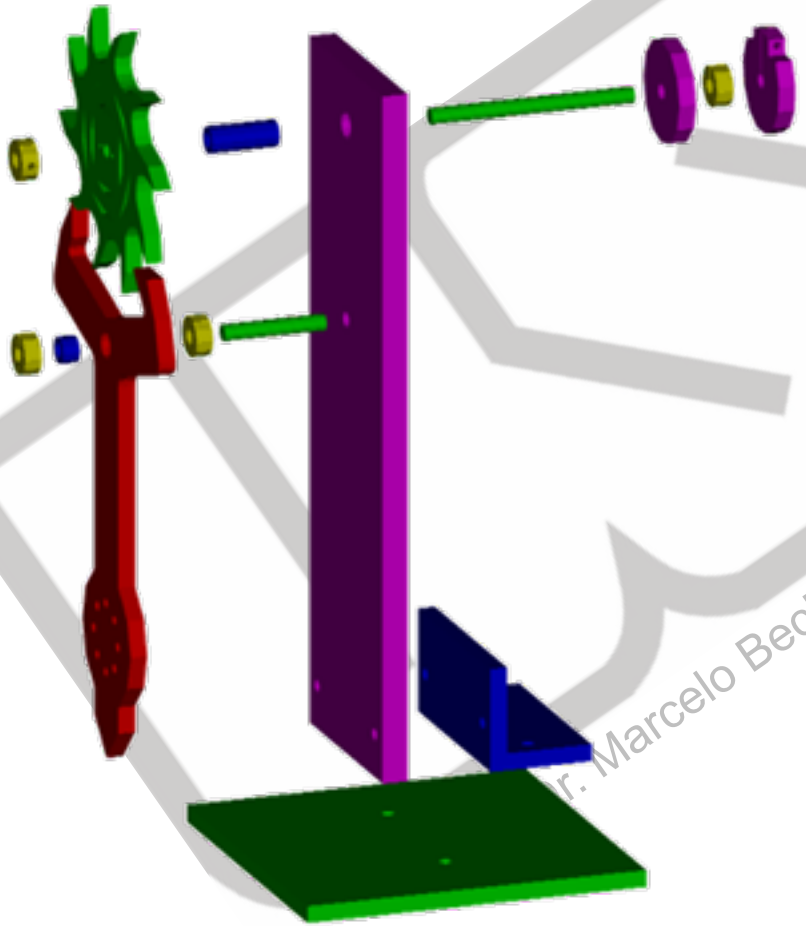


Histórico

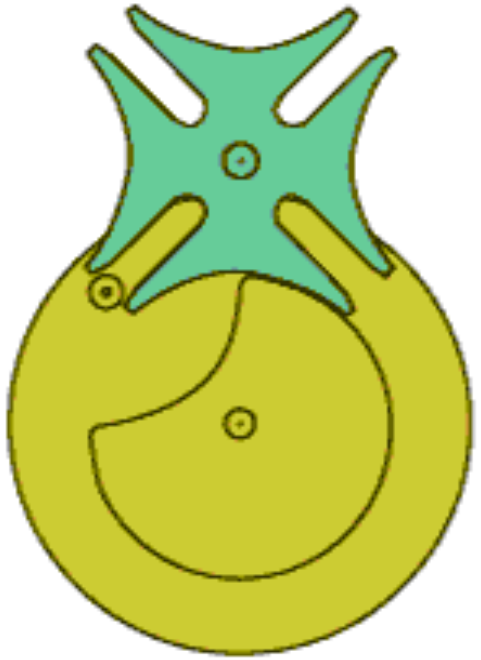
Pontes Elevadiças - Basculantes



Histórico
Relógios

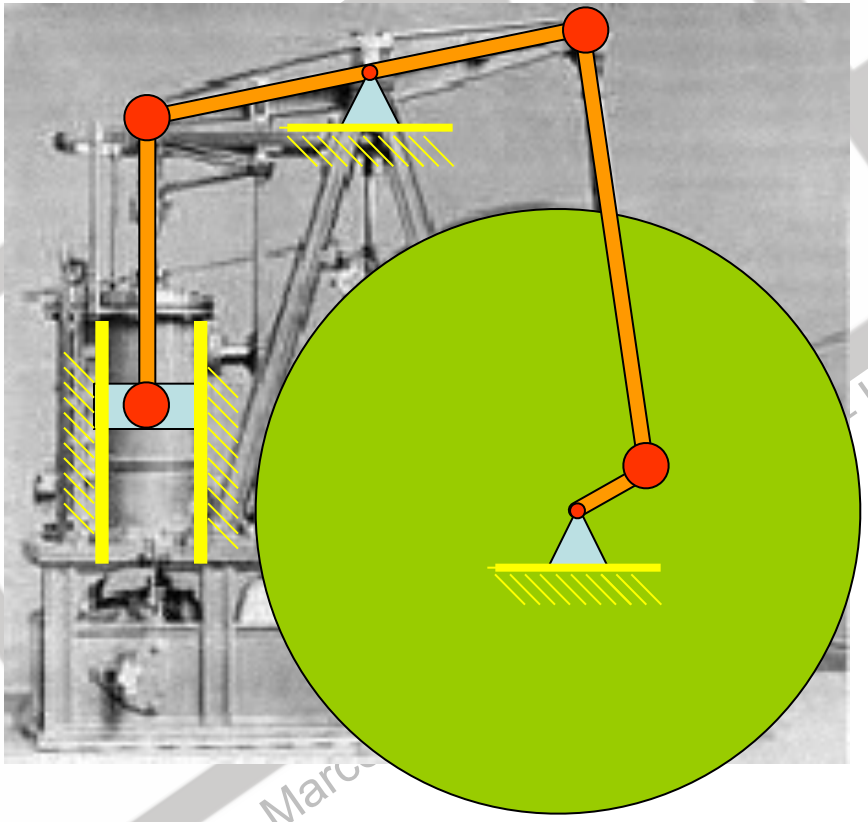


Histórico
Relógios



Histórico
Máquina a Vapor – Século XVIII

James Watt
* 1736
+ 1819



1755 – Máquina a Vapor

Histórico
Teares

Revolução Industrial
Inglaterra – séc. XIX

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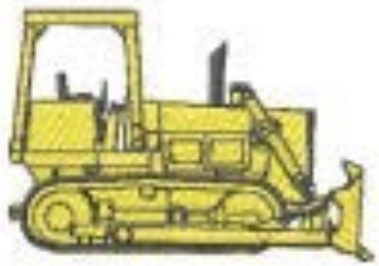
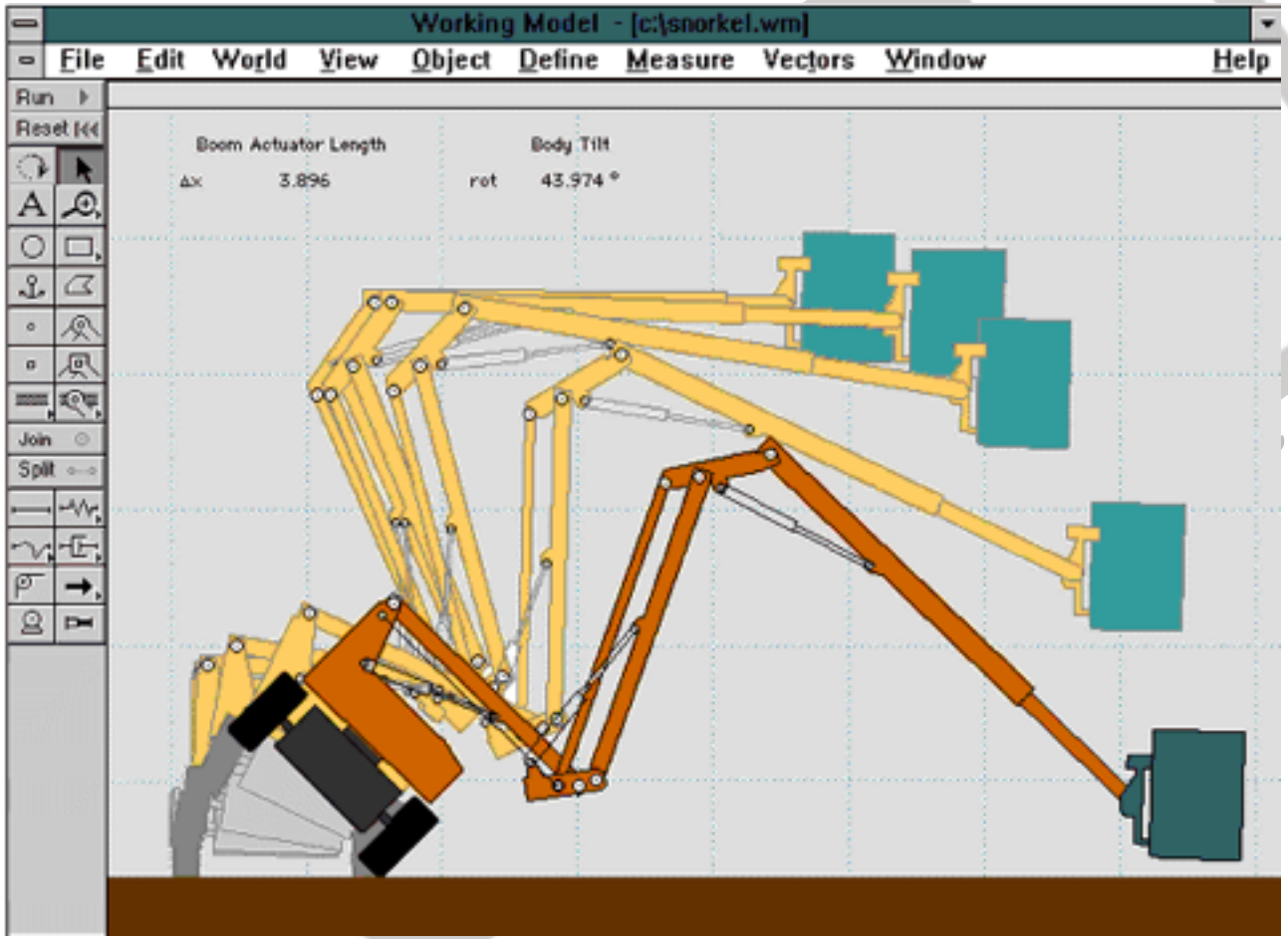
- **Exemplos de Aplicação**

Exemplos de Aplicação

Indústria

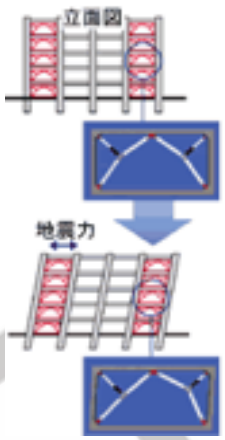


Exemplos de Aplicação
Indústria



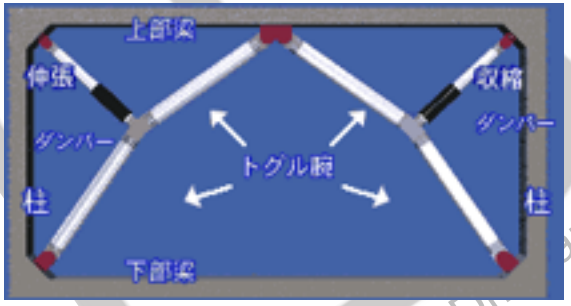
Histórico

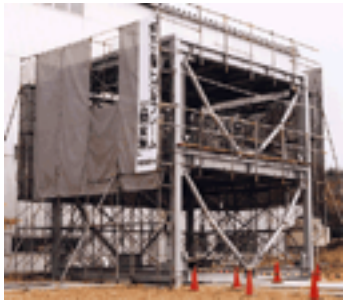
Indústria Civil - Terremotos



TYPE-1 両妻トグル制震

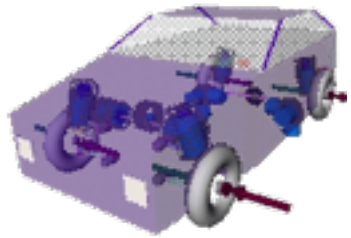
TYPE-2 構面外トグル制震



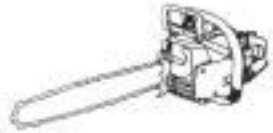
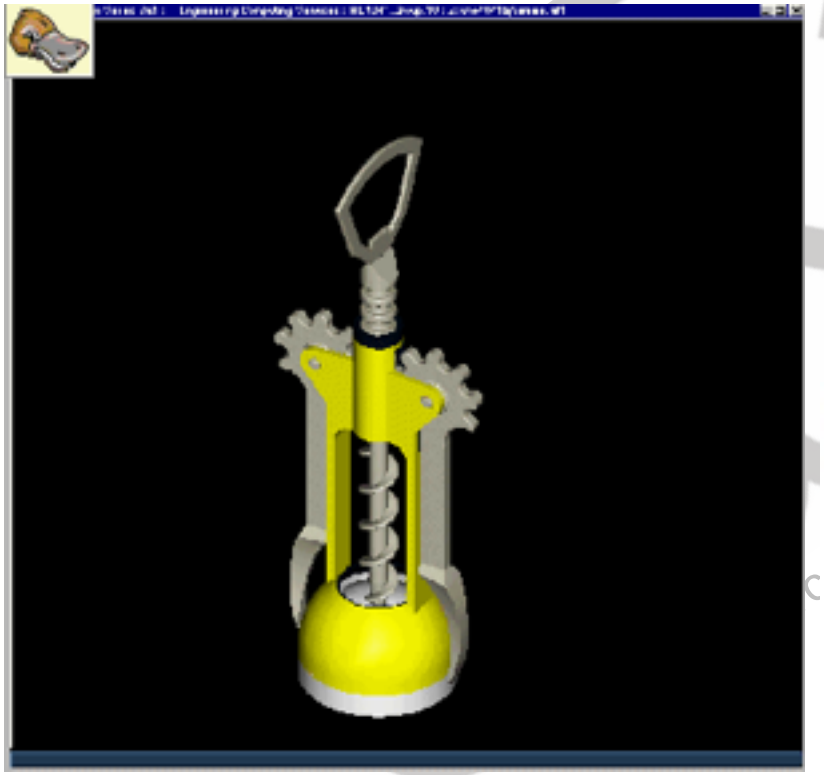


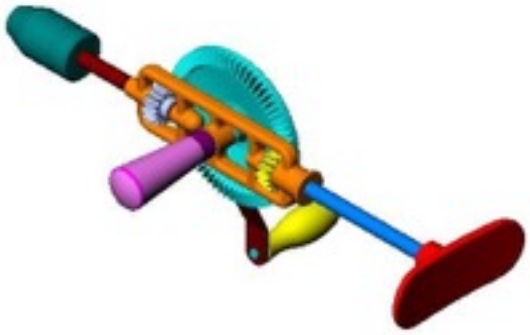
Exemplos de Aplicação

Bicicletas / Carros



Exemplos de Aplicação
Utensílios Domésticos / Ferramentas



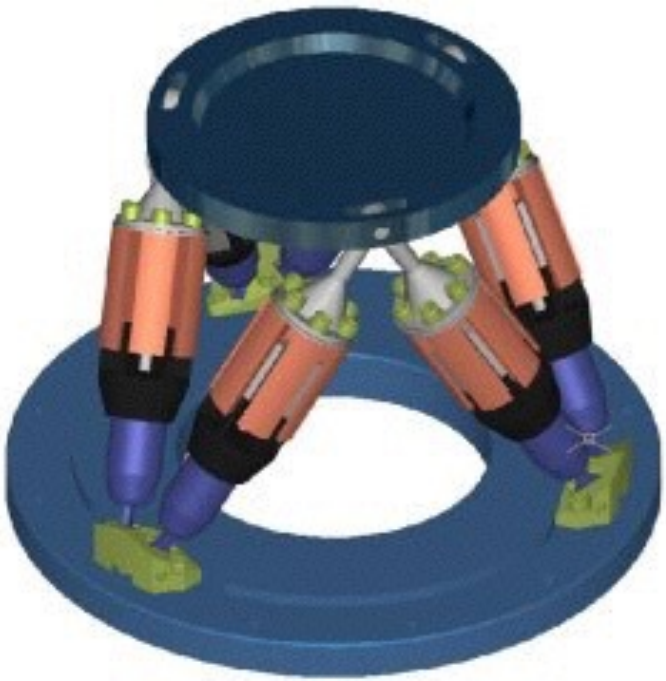
Exemplos de Aplicação
Agro-Industria



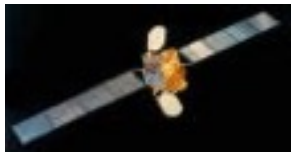


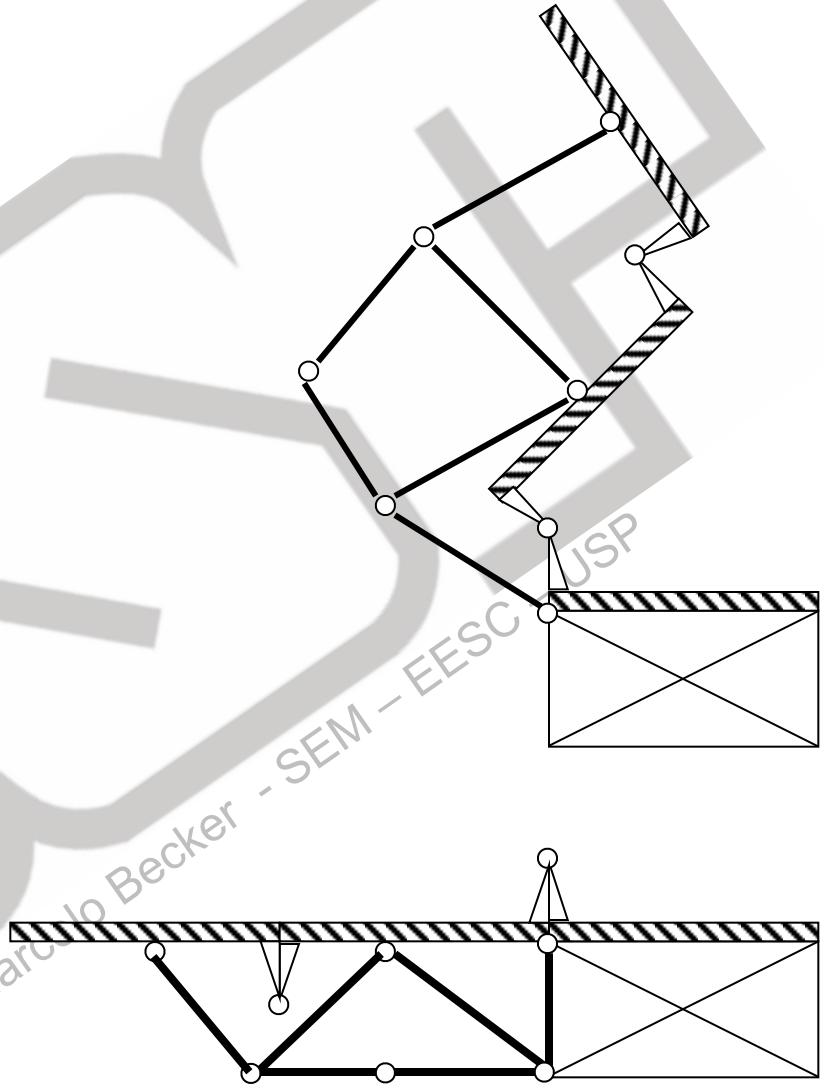


Exemplos de Aplicação
Simuladores

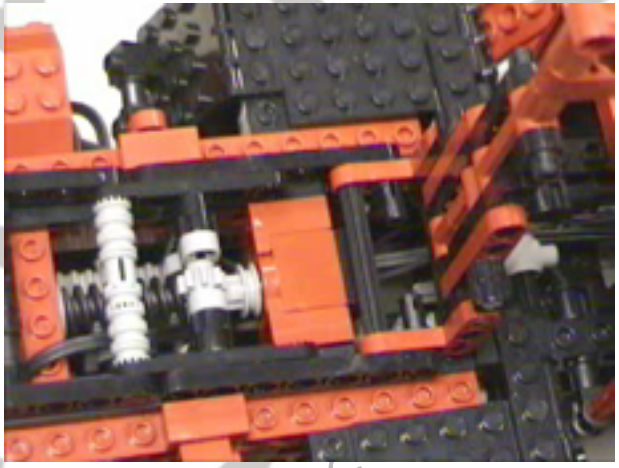


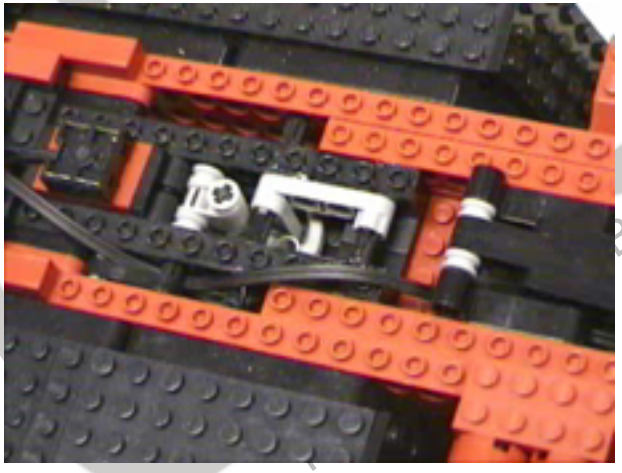
Histórico
Satélites





Exemplos de Aplicação
Brinquedos - Lego





Exemplos de Aplicação
Brinquedos - Automata

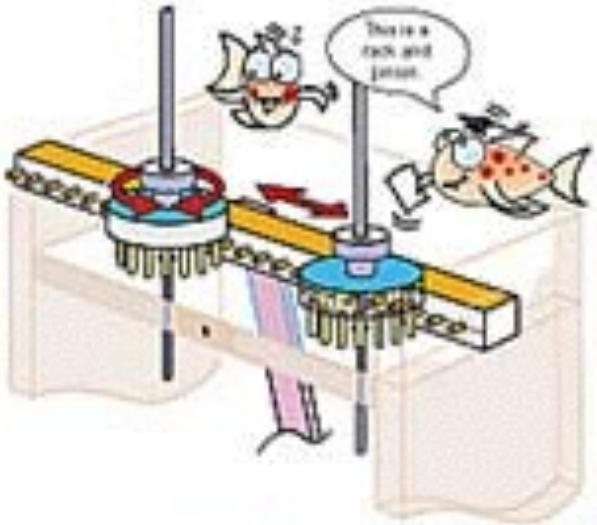
Exemplos de Aplicação
Brinquedos - Automata

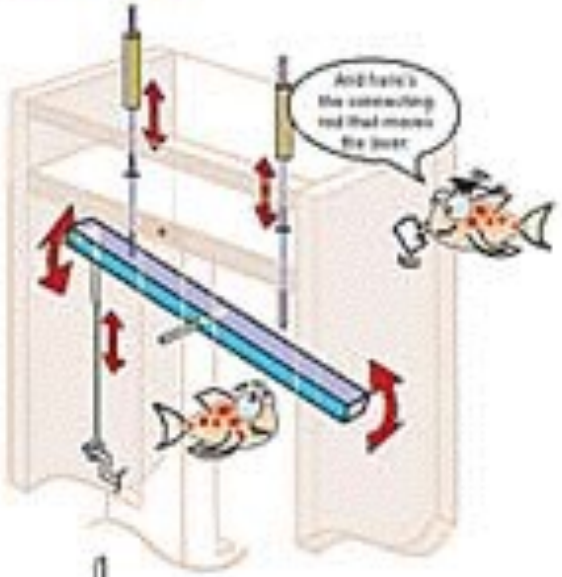


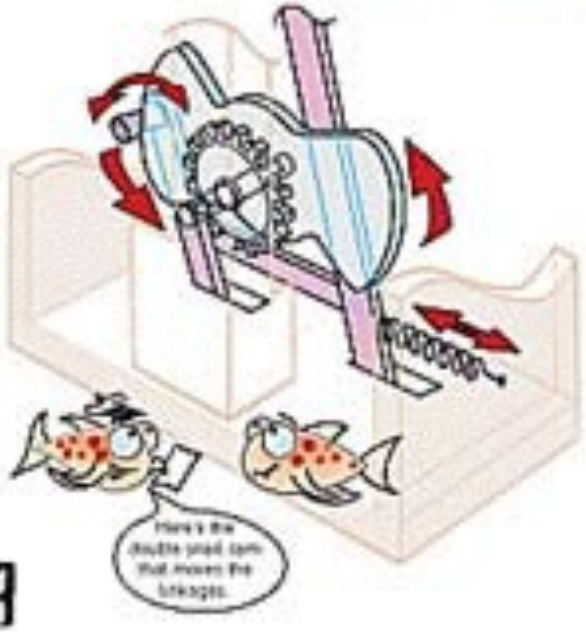


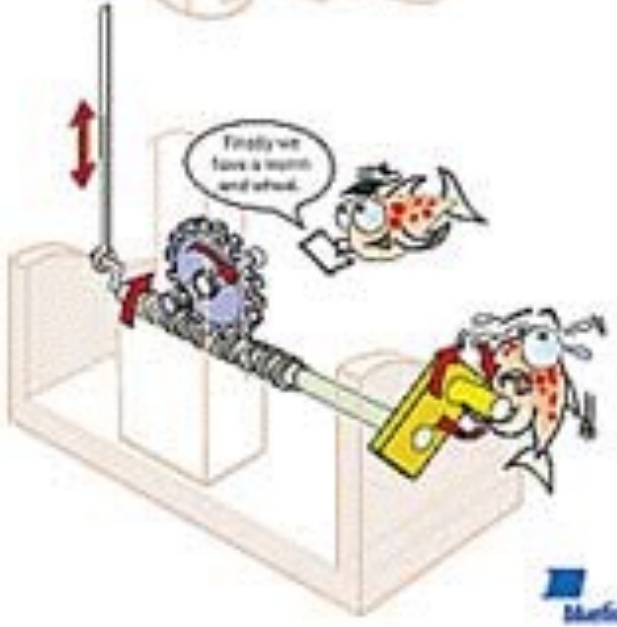



MAKING MOVEMENT





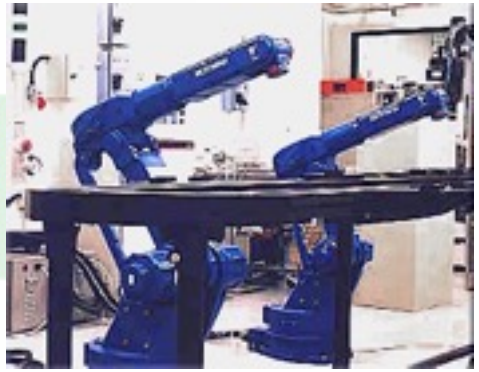




Turn the handle and the fish move left, right, backwards and forwards. This poster shows the mechanisms that create the movement. Can you explain what each one does? How do they work together?

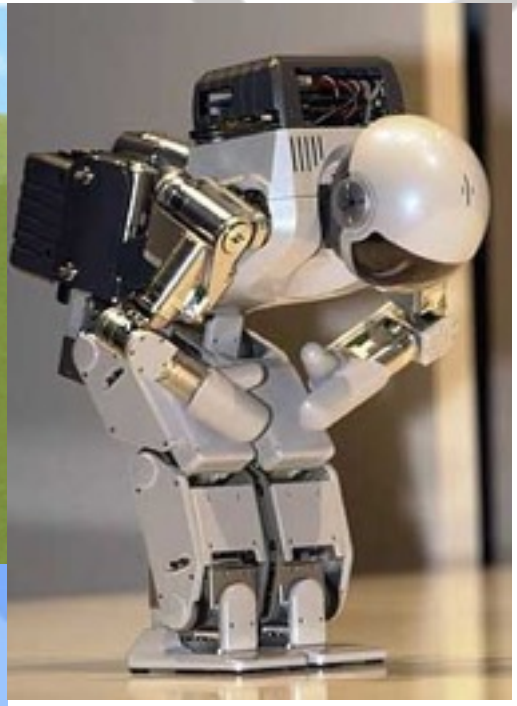
Exemplos de Aplicação

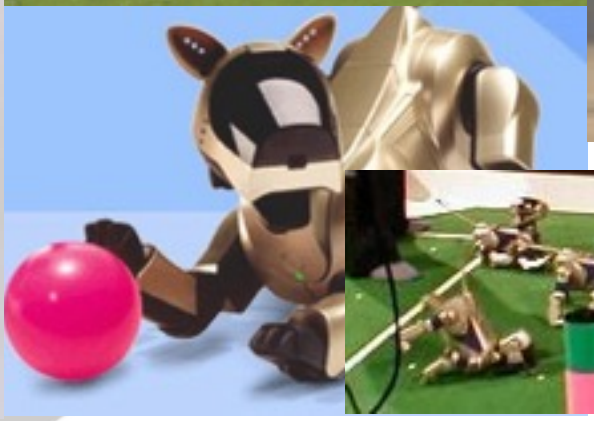
Robótica "Ontem"



Exemplos de Aplicação

Robótica "Hoje"



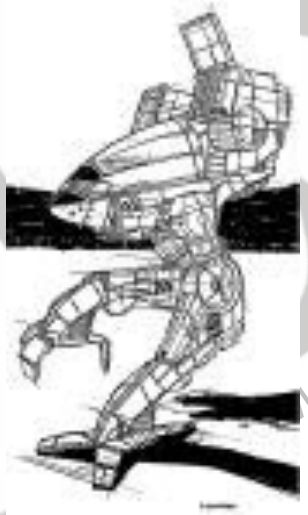


Exemplos de Aplicação

Robótica "Amanhã"

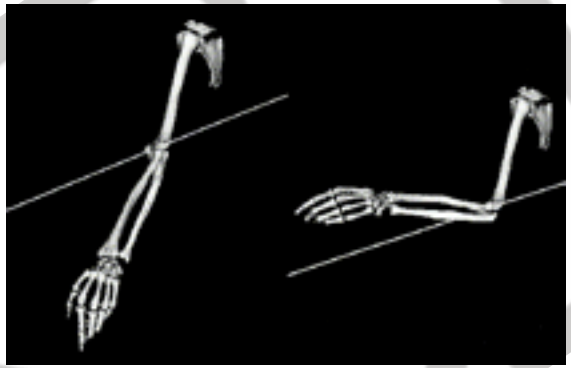
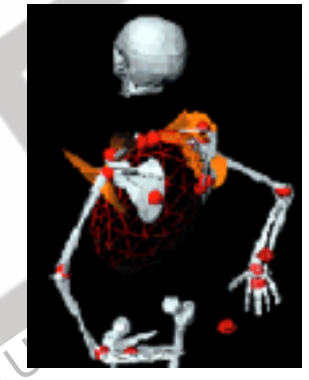
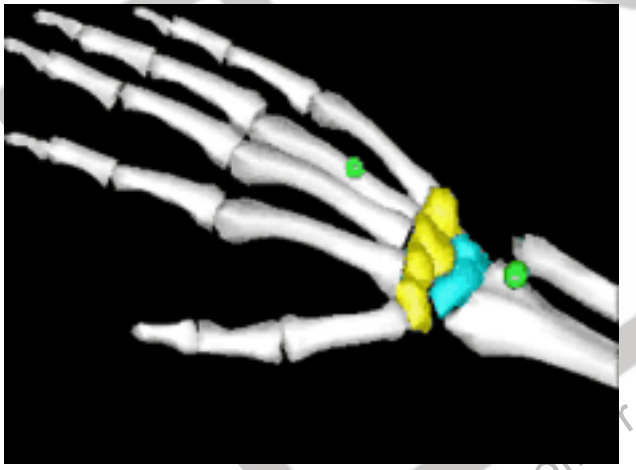
Exemplos de Aplicação

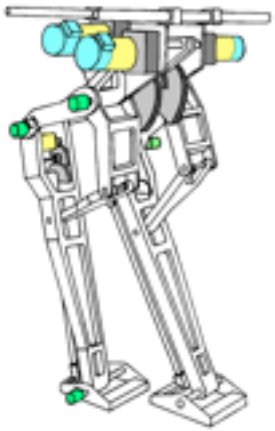
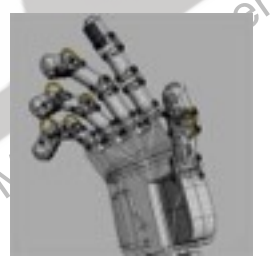
Robótica - Cinema



Exemplos de Aplicação
Biomecânica




Perguntas?

Próxima Aula

- Graus de Liberdade
- Cadeias Cinemáticas

- Pense: Quantos movimentos tem sua mão?