

SEM0104 - Aula 1

Introdução e Motivação

Prof. Assoc. Marcelo Becker

SEM - EESC - USP

Laboratório de Robótica Móvel

LabRoM

Prof. Dr. Marcelo Becker - SEM – EESC – USP

Sumário da Aula

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

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Informações sobre o Curso

- Aulas: 2 Turmas (Mecânica e Mk)

- Nota: $NF = 0,4 \times P_1 + 0,4 \times P_2 + 0,2 \times Ex$

- Datas da Provas:
  - P_1: **26/ABR/2017**
  - P_2: **05/JUL/2017**

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Informações sobre o Curso

Calendário 1º Semestre de 2016: 30 aulas - Mecatrônica - Turma 2



Aulas às 2ªs e 4ªs

- Aulas
- Provas
- Viagens Agendadas - Prof. Becker
- Feriados

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.

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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"**
- **NORTON, R. L. "Cinemática e Dinâmica de Mecanismos"**
- Notas de Aula

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Contato

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São Carlos - SP - 13566-590 – Brasil
Prédio da Mecatrônica – 2º andar – sala 29122
Tel: 16 - 3373 8646
e-mail: becker@sc.usp.br
Skype: marcelo.becker

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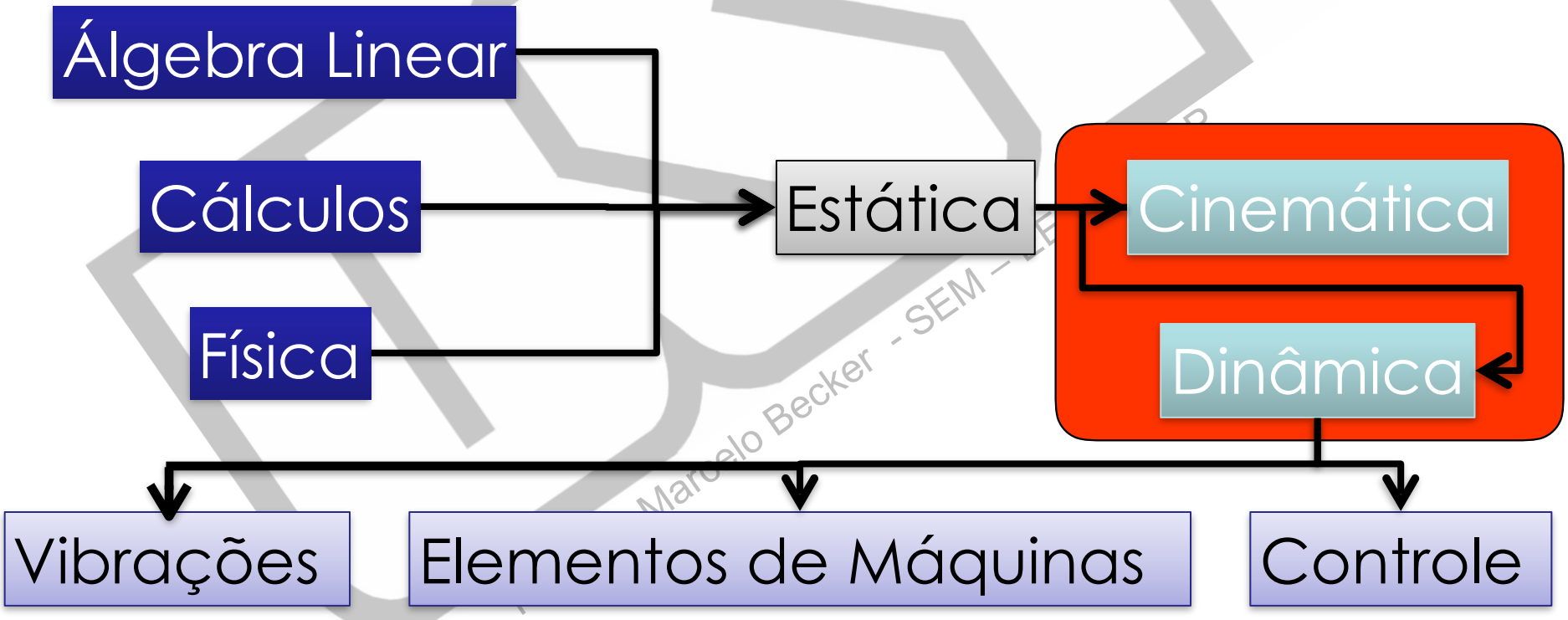
Sumário da Aula

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- **Introdução**
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- Exemplos de Aplicação

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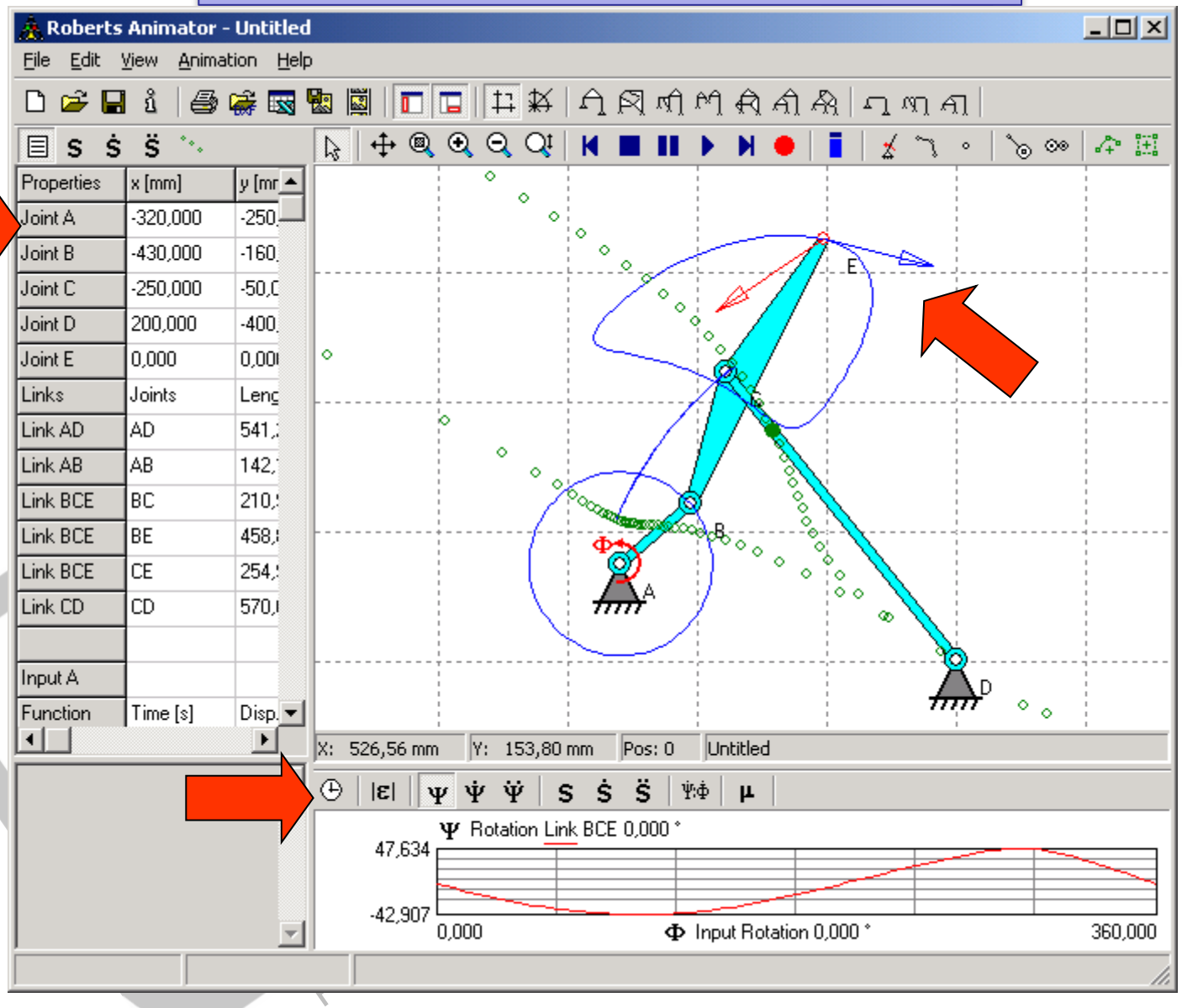
Introdução e Motivação

- Pergunta: O porquê de se estudar mecanismos?

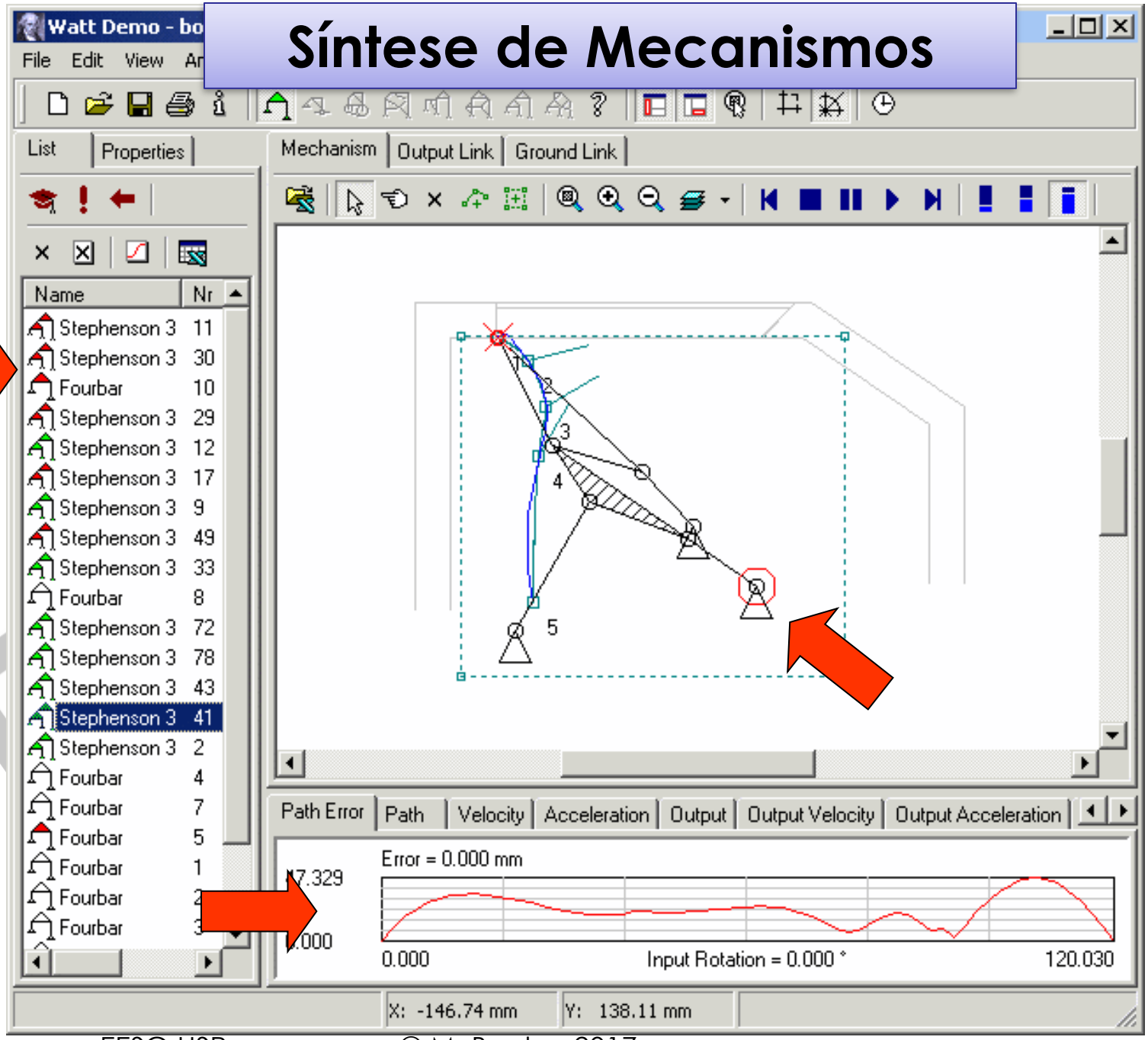


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Análise de Mecanismos



Síntese de Mecanismos



Sumário da Aula

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

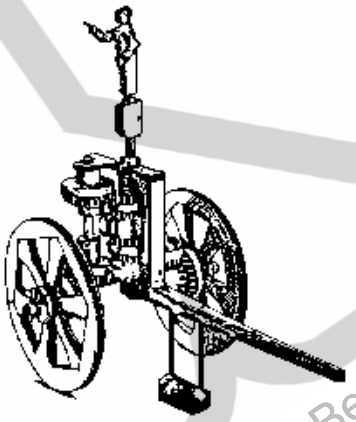
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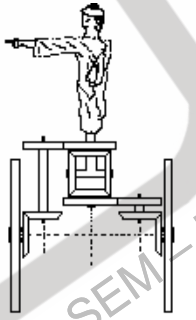
Histórico

Carroça Chinesa (2.634 a.C.)

Imperador Huang Di (China)





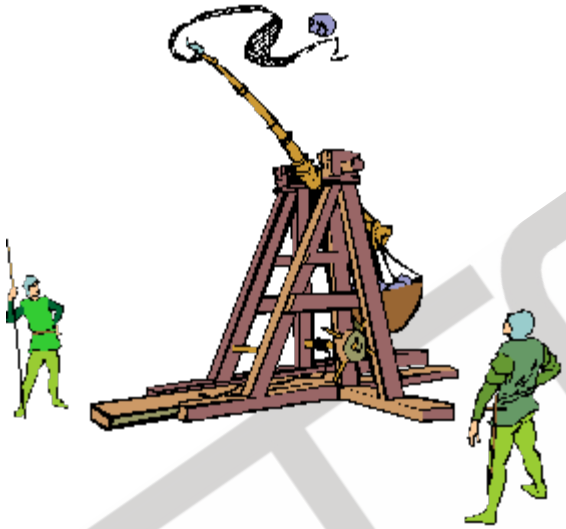


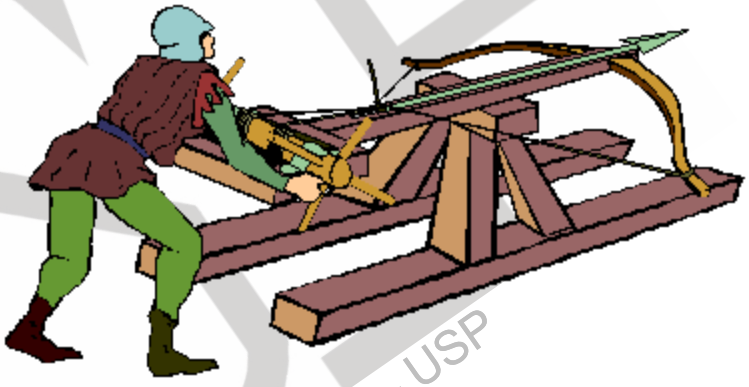


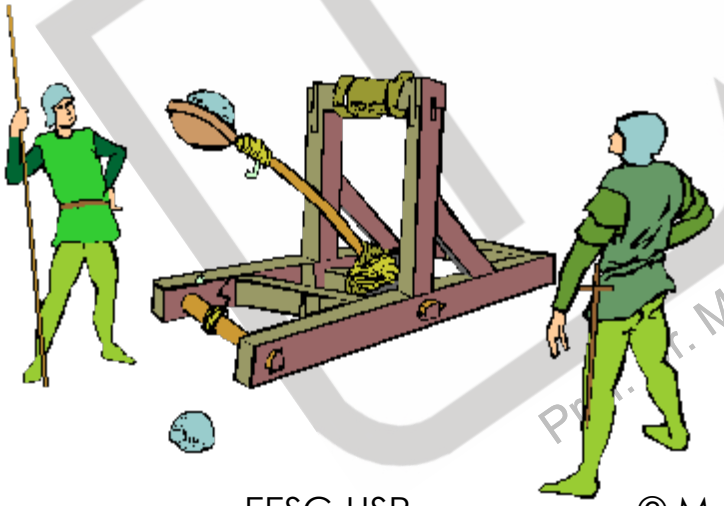
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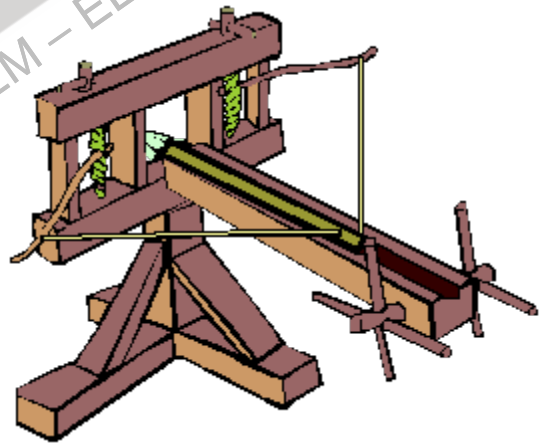
Histórico

Armas









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Histórico

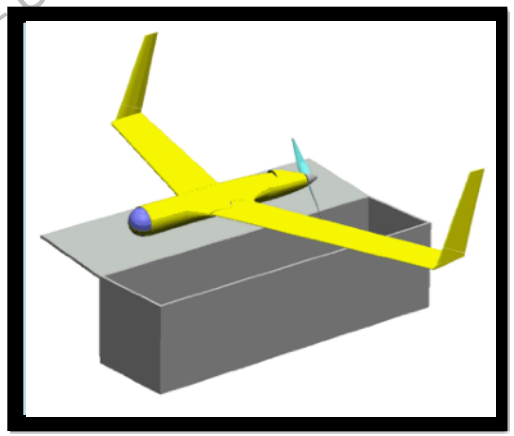
Catapultas 'Modernas'







Aeromodelos
e
Planadores

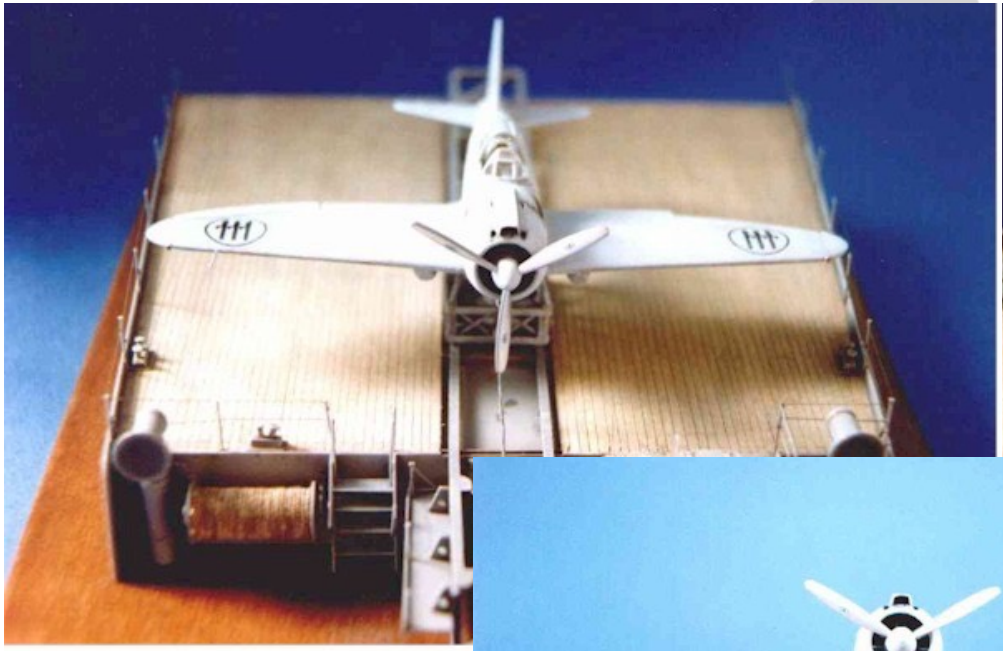


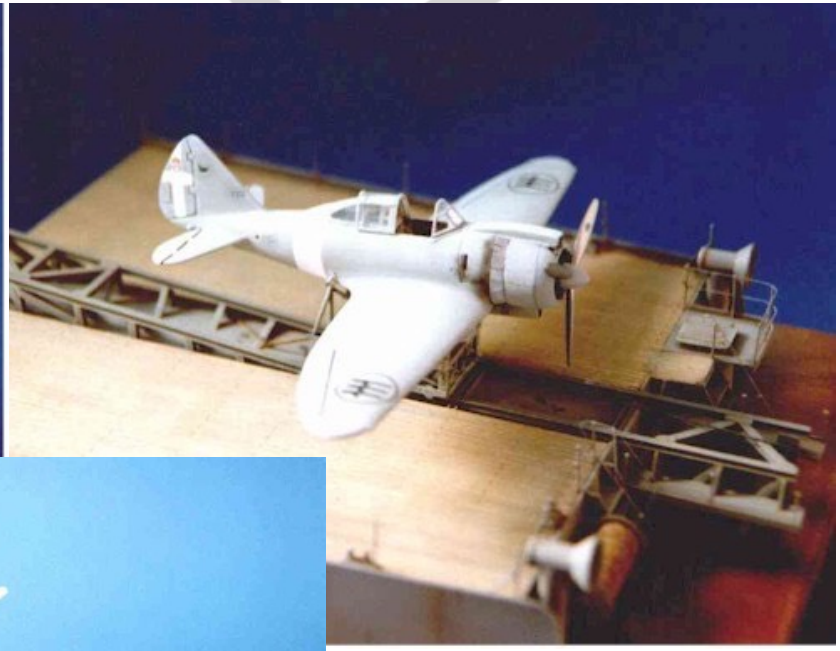
Prof. Dr.

Histórico

Catapultas 'Modernas'









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Histórico

Catapultas 'Modernas'



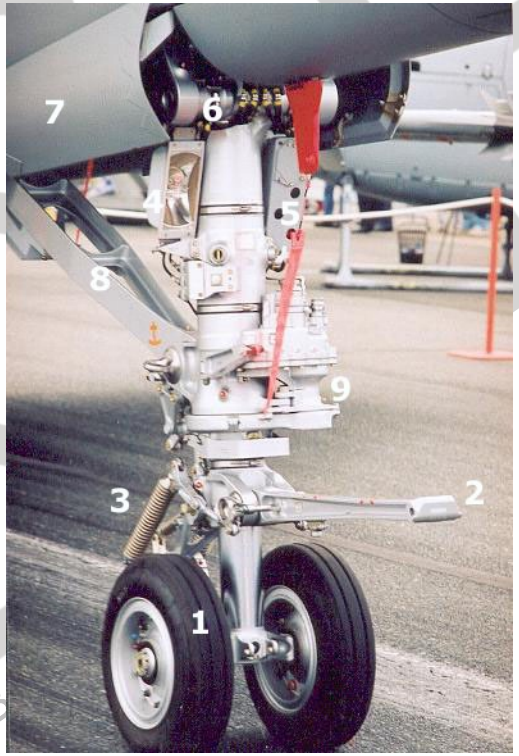


Histórico

Catapultas 'Modernas'















Histórico
Armas



Cel. Samuel Colt
(*1814 + 1862)

Peças Intercambiáveis









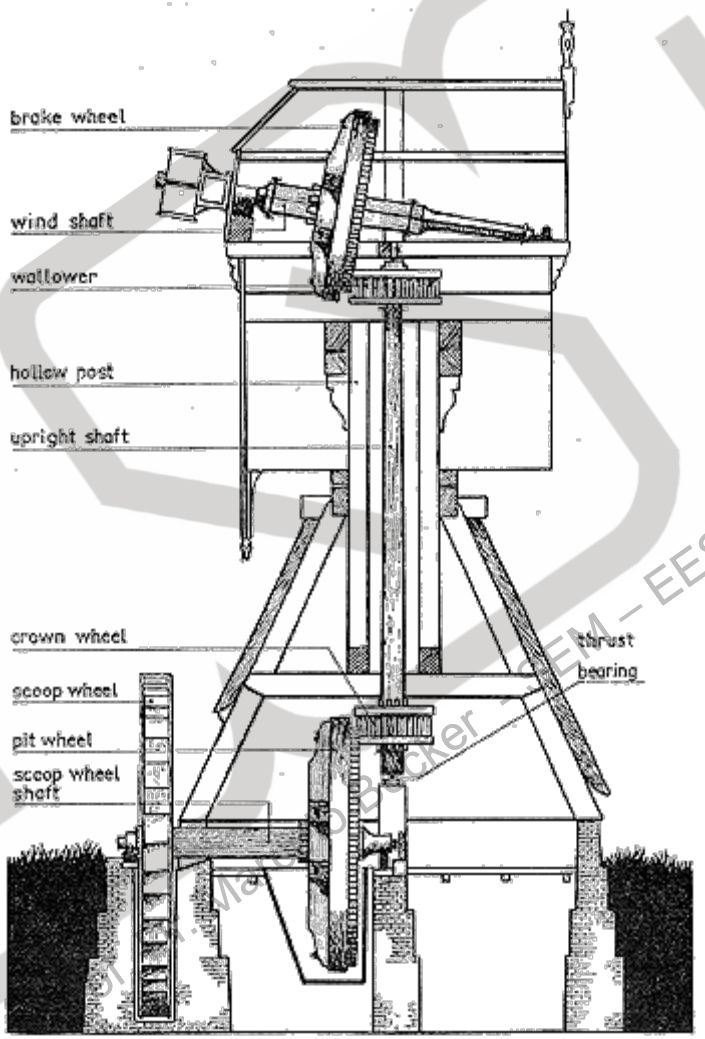
Prof. Dr. M... SEM – EE...

Histórico
Moinhos de Vento













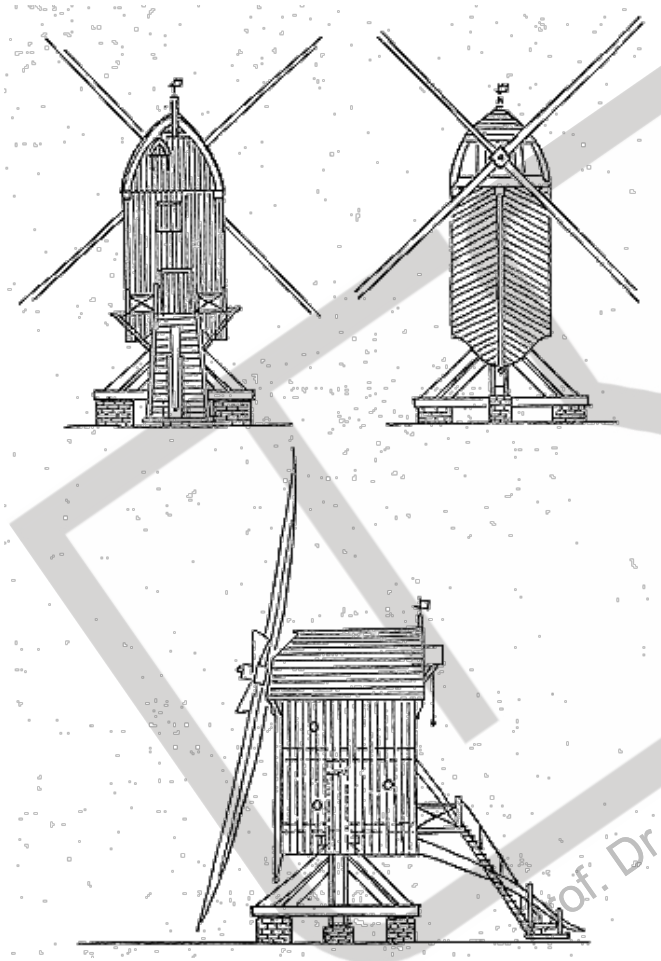


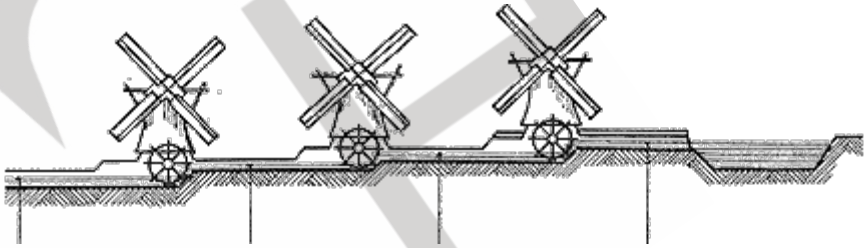
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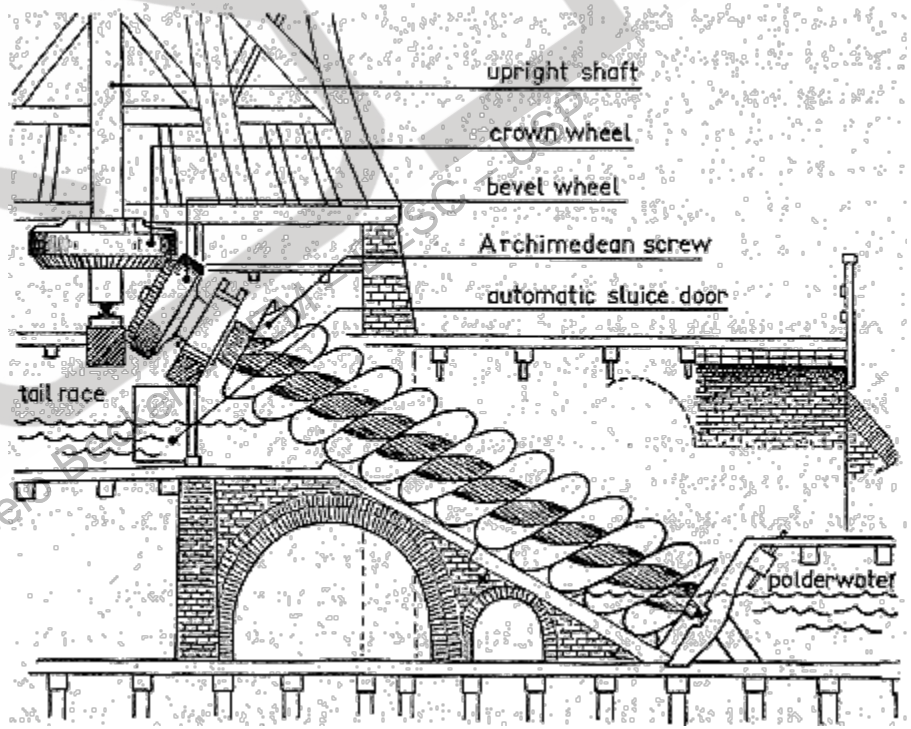
Histórico
Moinho de Vento









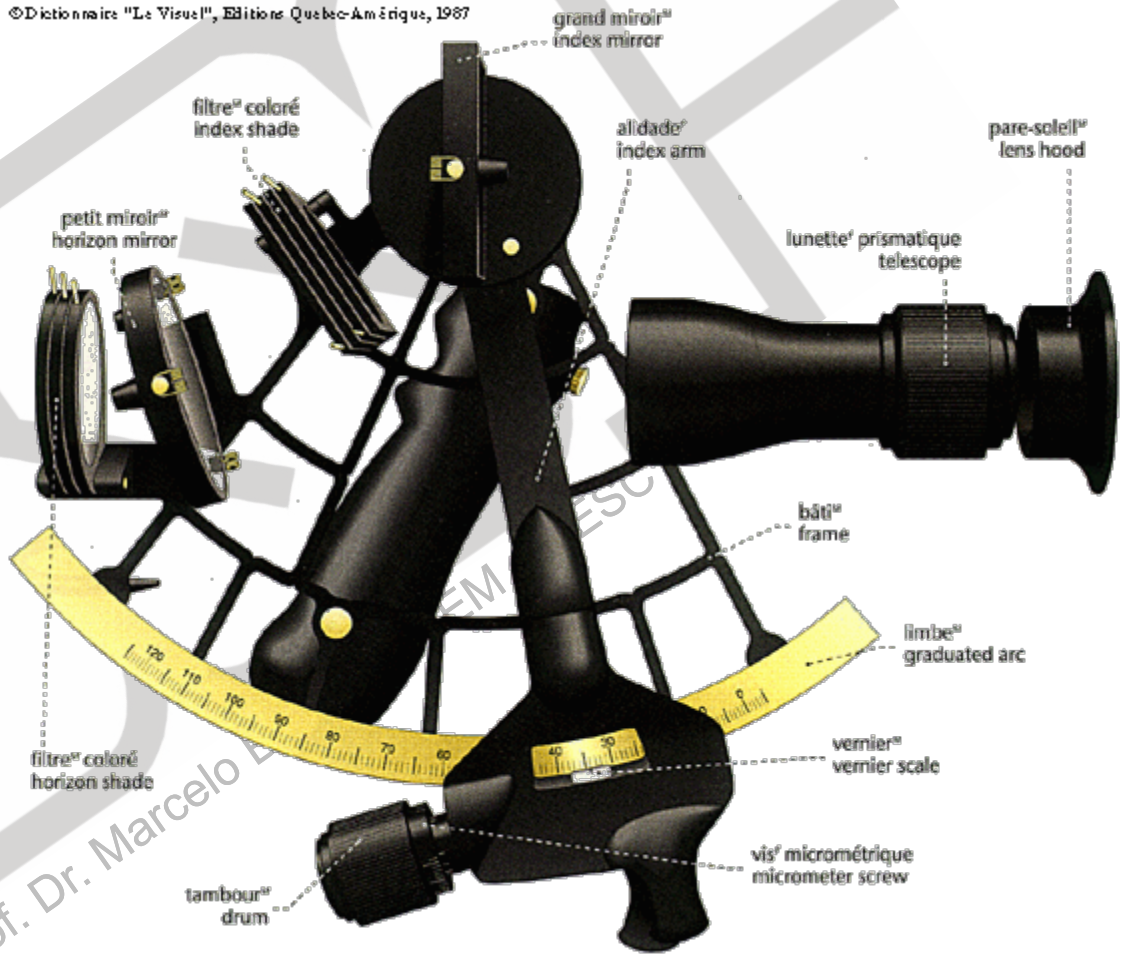


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Histórico
Instrumentos de Navegação



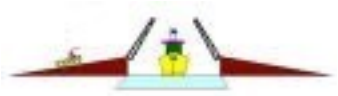




Prof. Dr. Marcelo

Histórico

Pontes Elevadiças - Basculantes







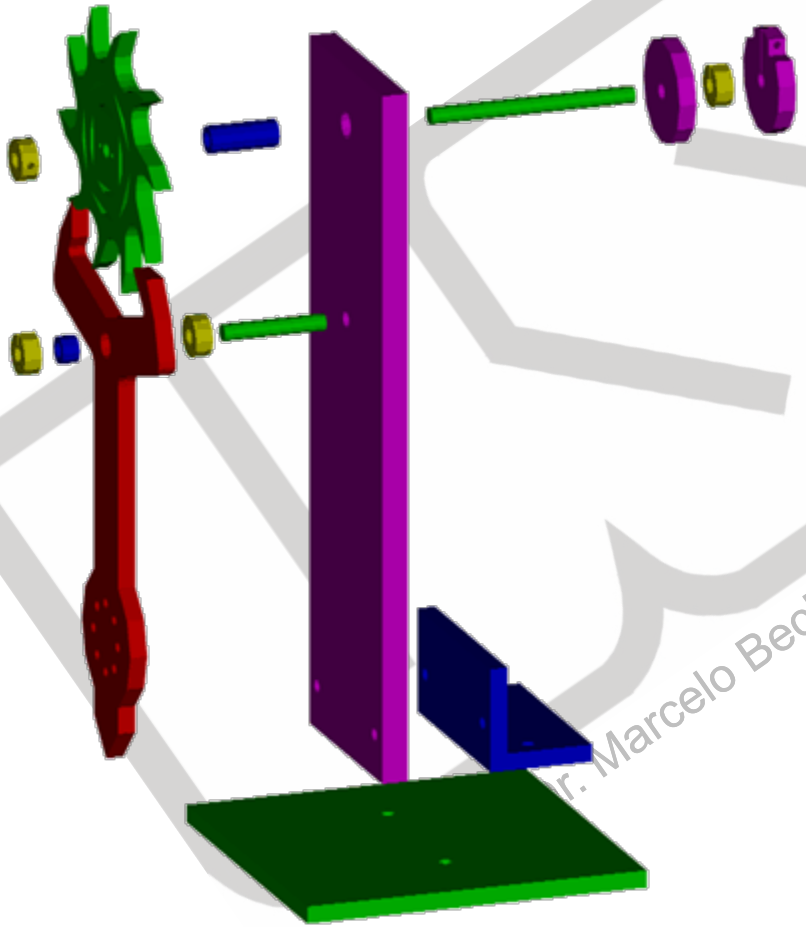


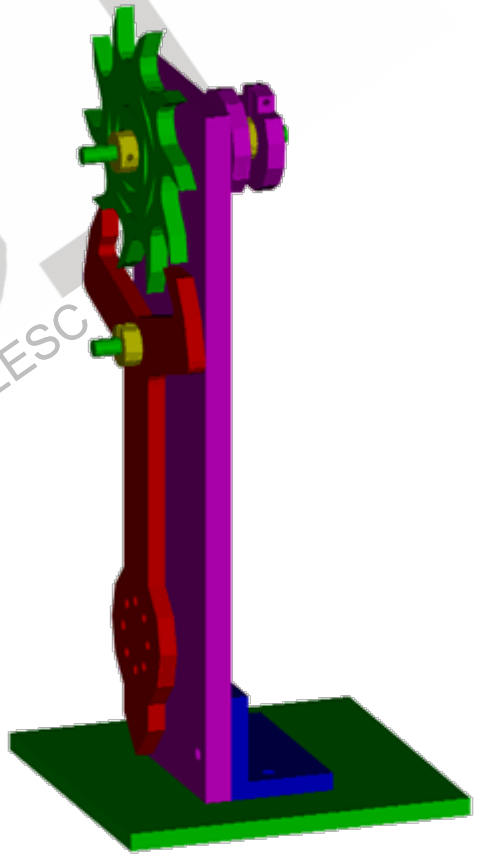


Prof

Histórico
Relógios

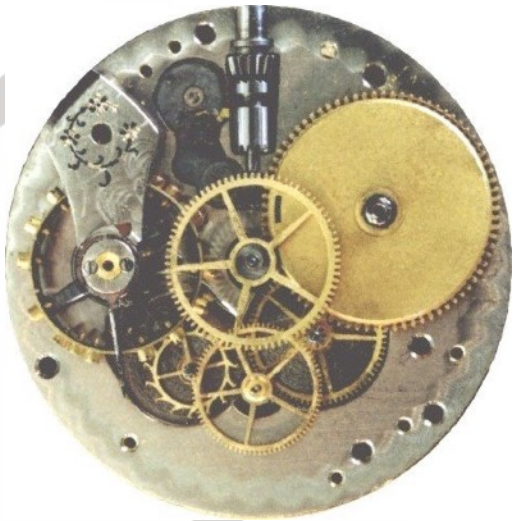




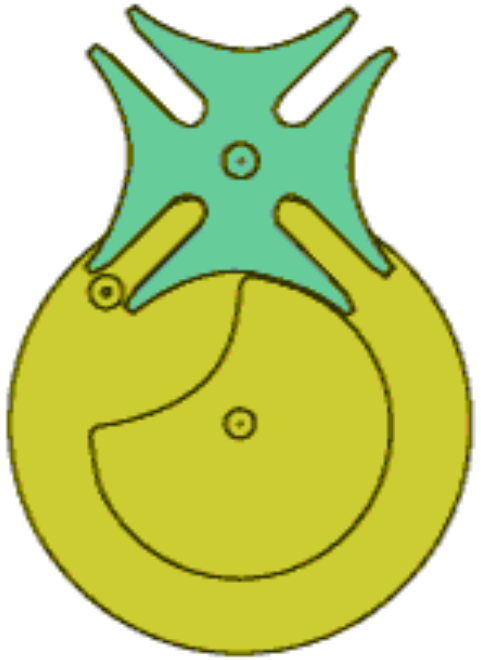


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Histórico
Relógios





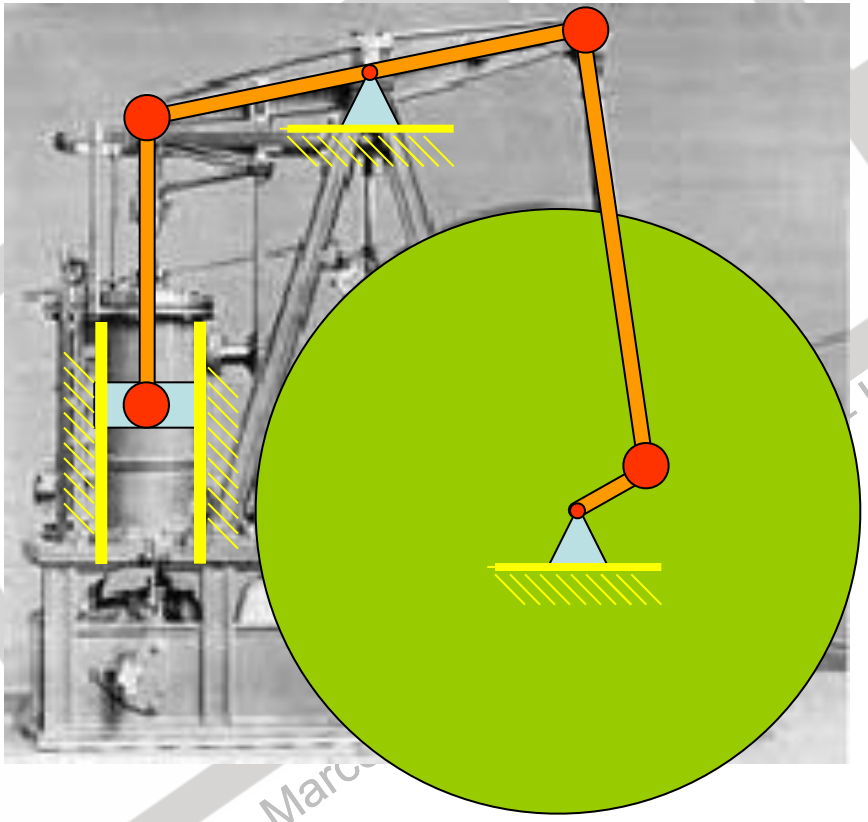


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Histórico
Máquina a Vapor – Século XVIII



James Watt
* 1736
+ 1819



1755 – Máquina a Vapor

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Histórico
Teares









Revolução Industrial
Inglaterra – séc. XIX

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

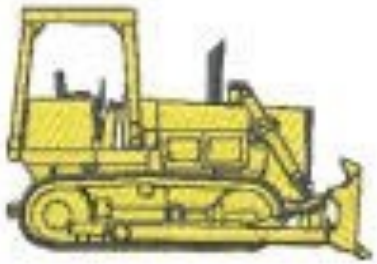
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Exemplos de Aplicação
Indústria







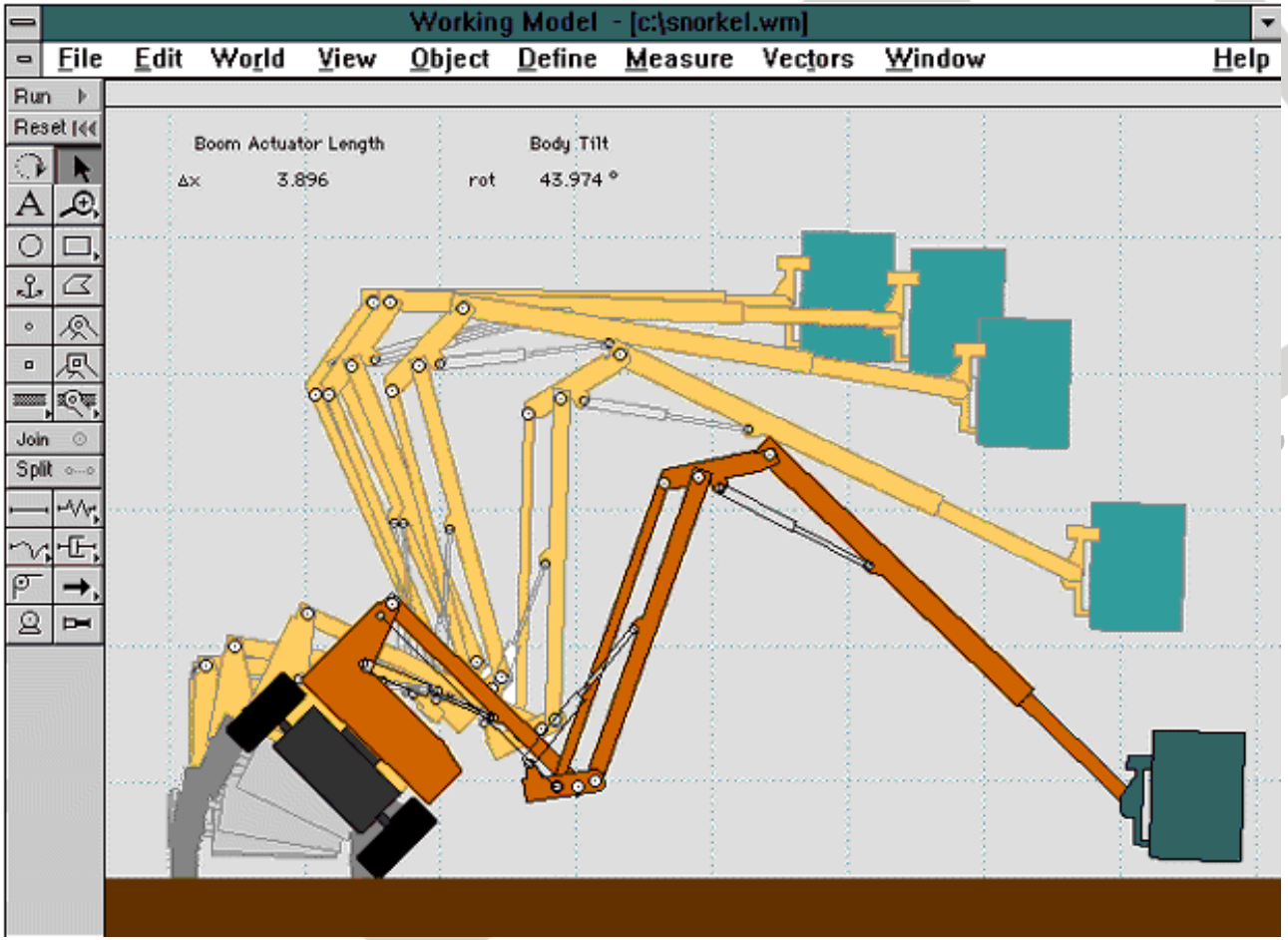








Exemplos de Aplicação
Indústria

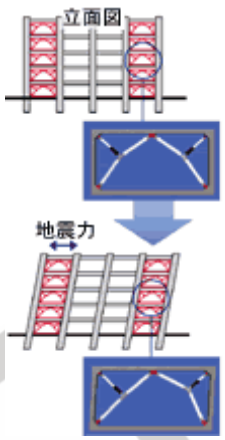








Histórico
Indústria Civil - Terremotos

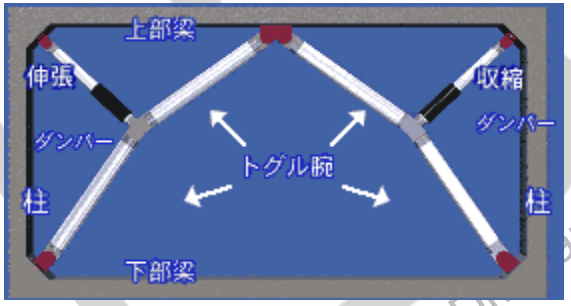




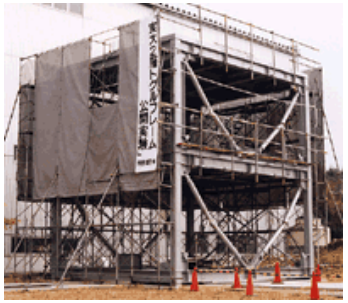
TYPE-1 両妻トグル制震



TYPE-2 構面外トグル制震







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Exemplos de Aplicação

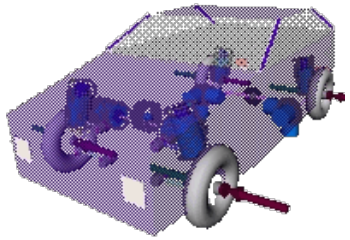
Bicicletas / Carros











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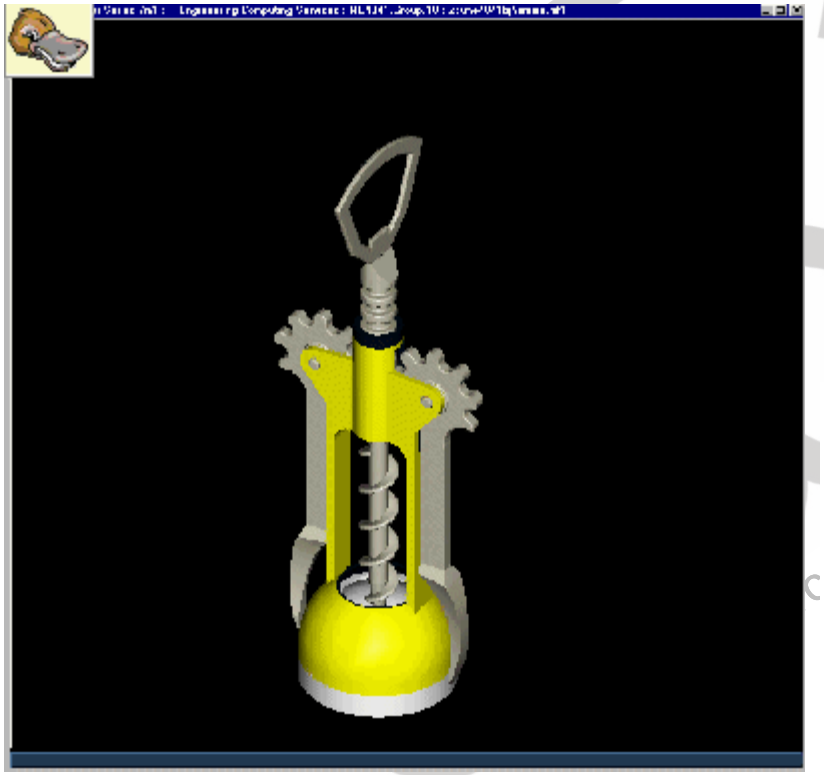
Exemplos de Aplicação
Utensílios Domésticos / Ferramentas

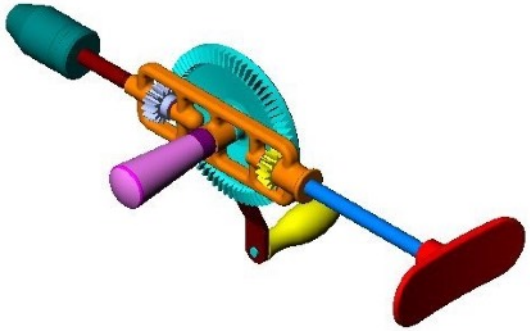














Exemplos de Aplicação
Agro-Industria



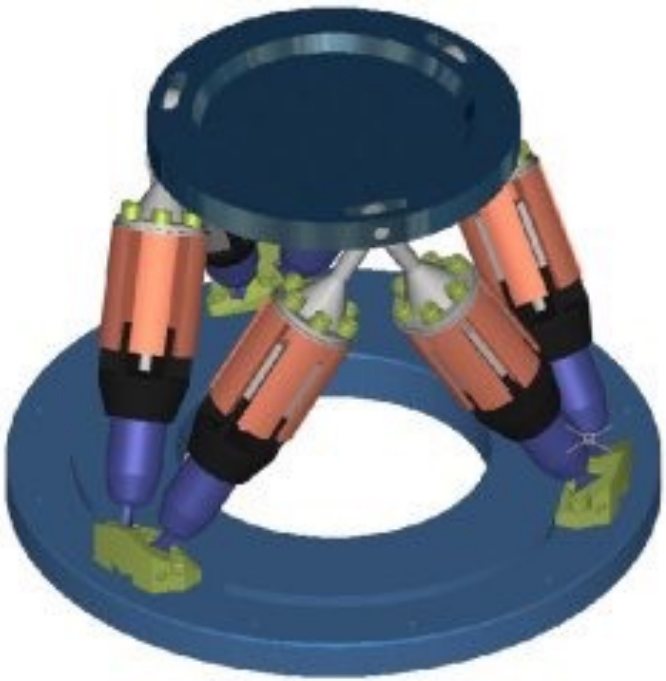






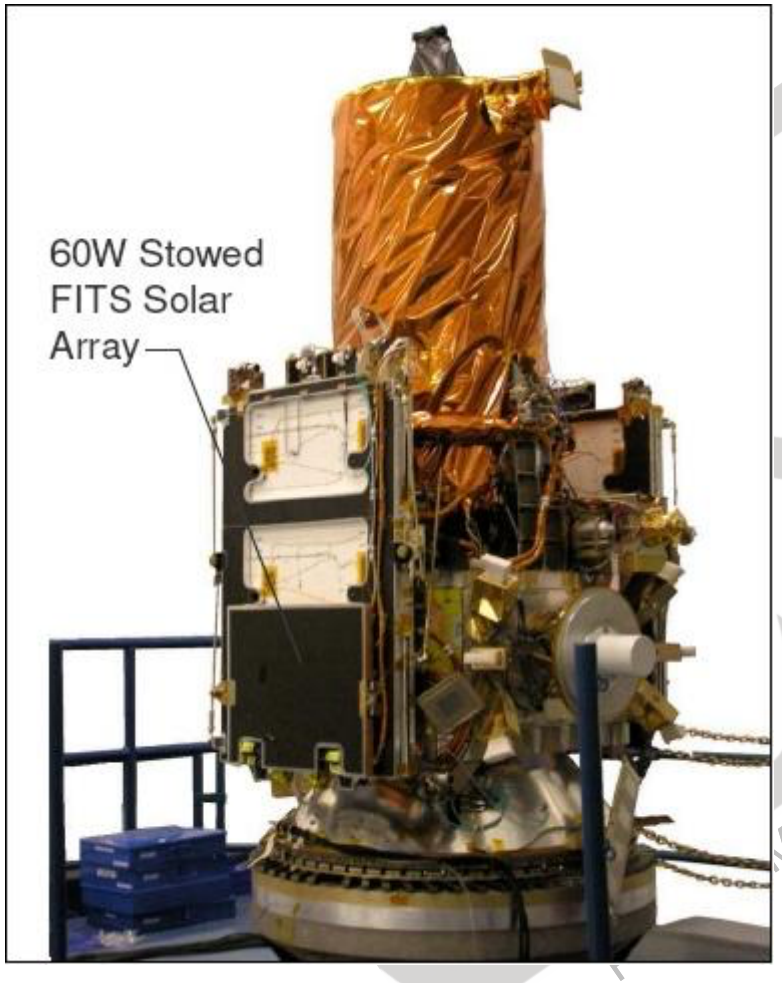
Exemplos de Aplicação
Simuladores





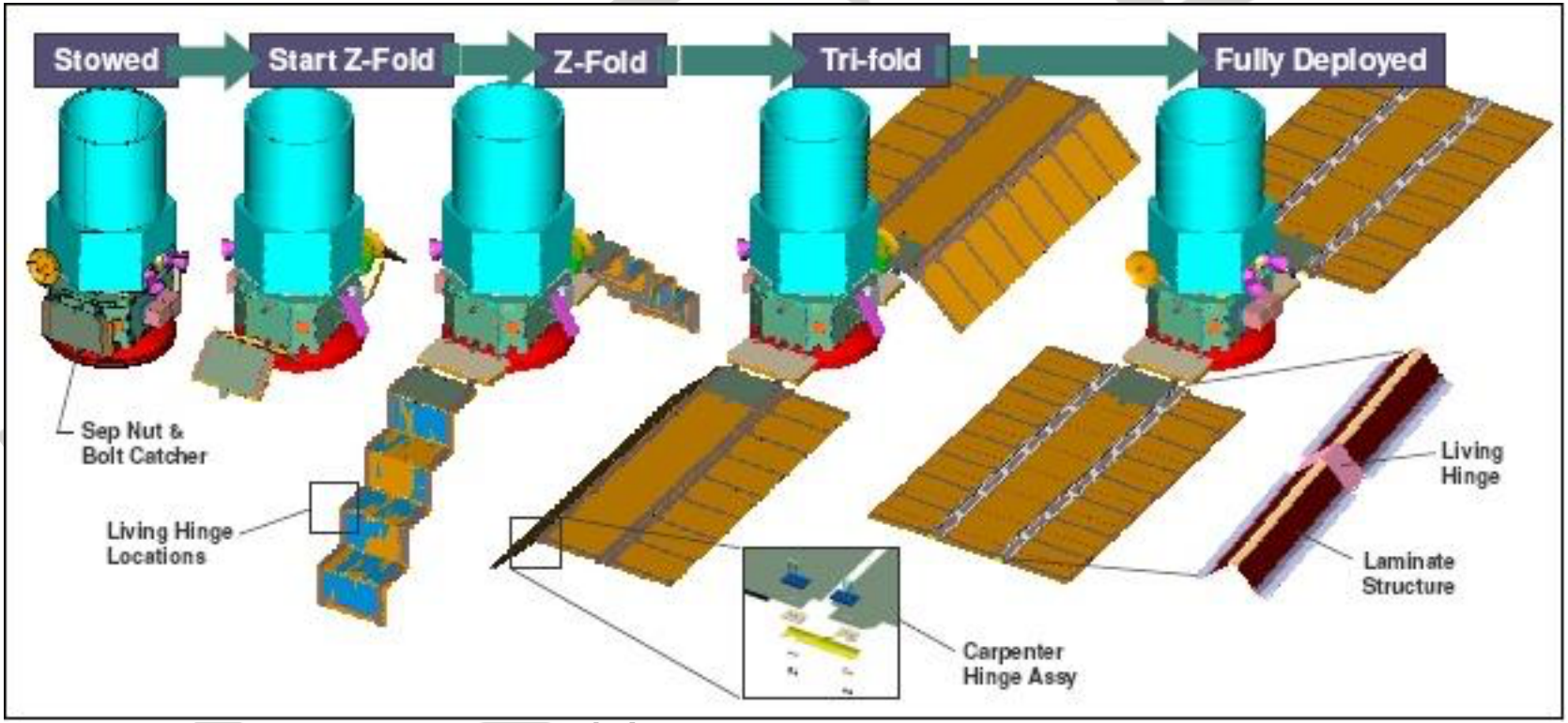
Prof. Dr. M

Histórico
Satélites





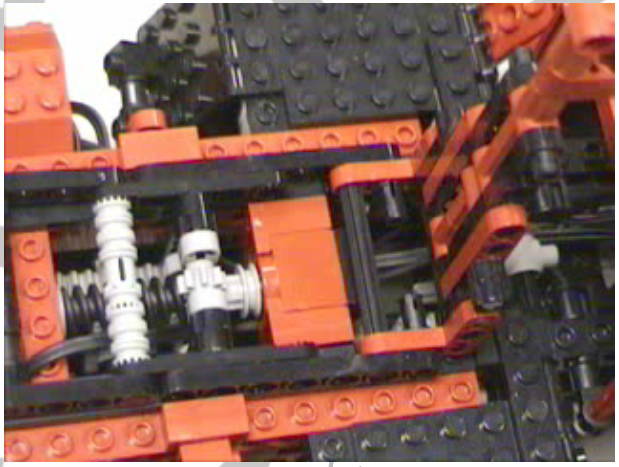
Histórico
Satélites

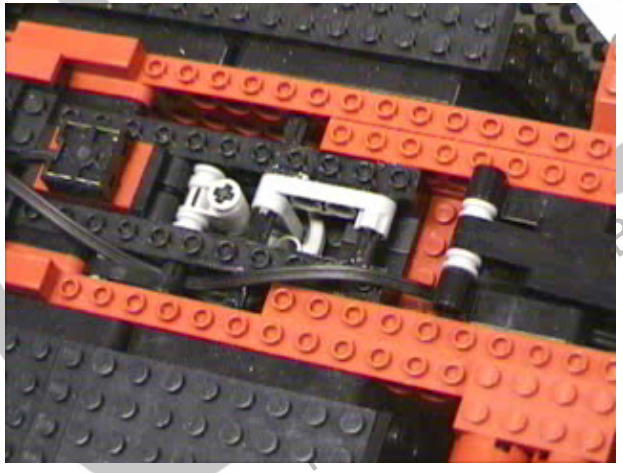


Prof. Dr.

Exemplos de Aplicação
Brinquedos - Lego









Exemplos de Aplicação
Brinquedos - Automata









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Exemplos de Aplicação
Brinquedos - Automata







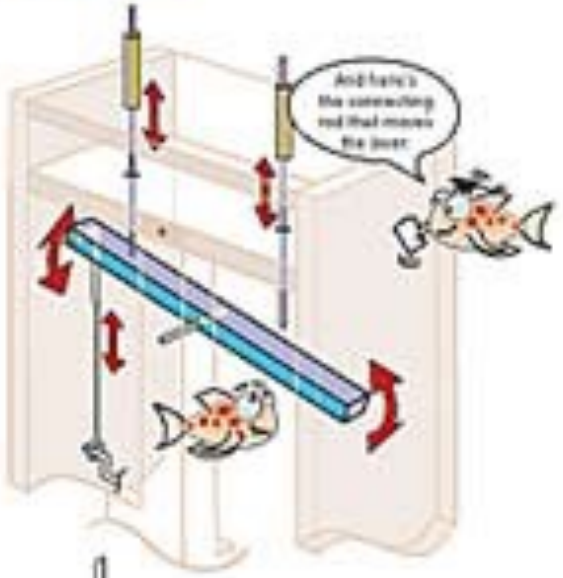


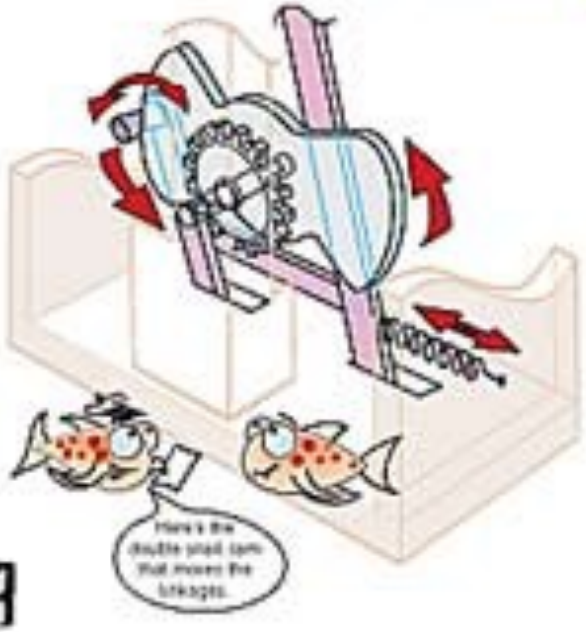


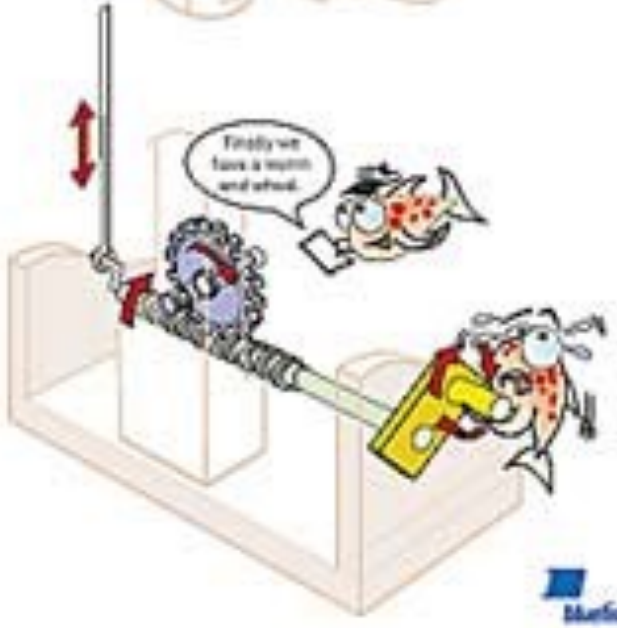
MAKING MOVEMENT







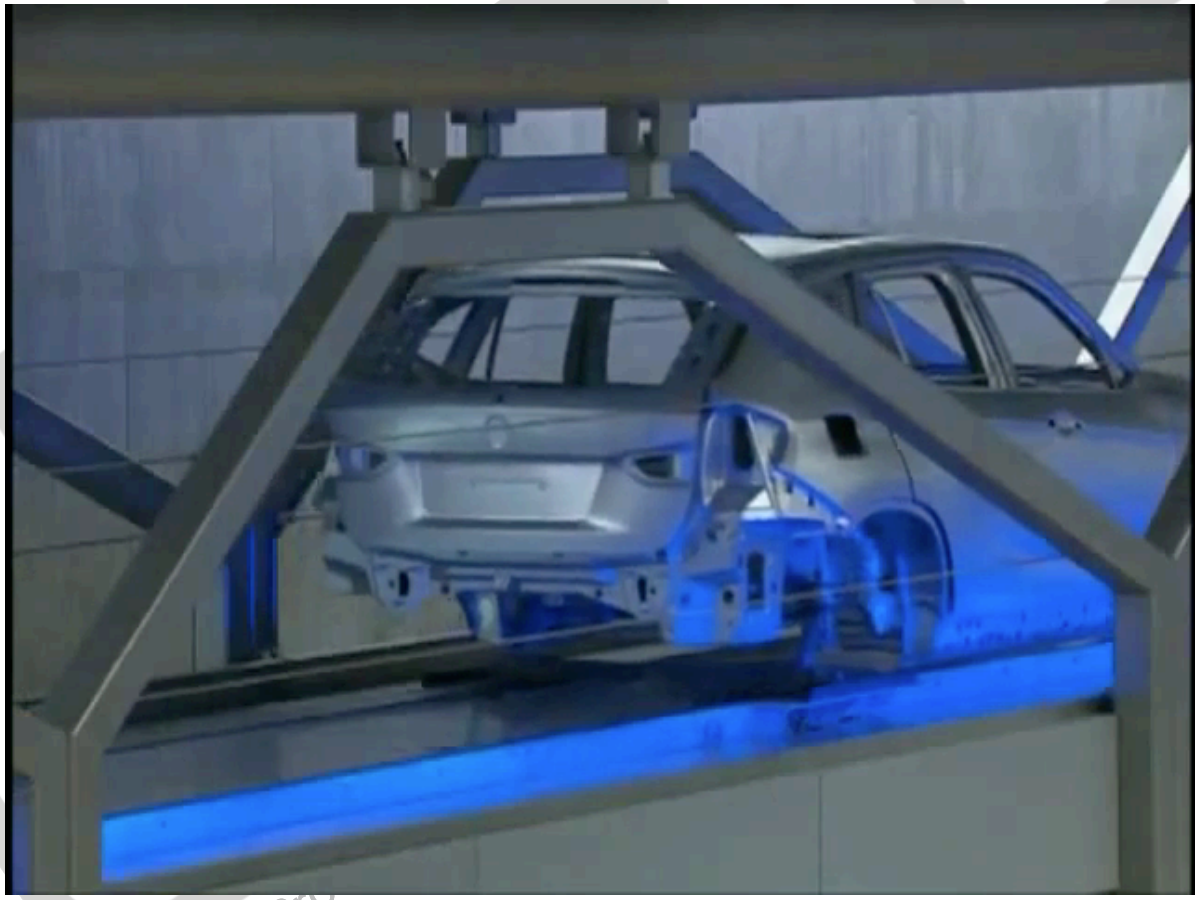




Turn the handle and the fish move left, right, backwards and forwards. This poster shows the mechanisms that create the movement. Can you explain what each one does? How do they work together?

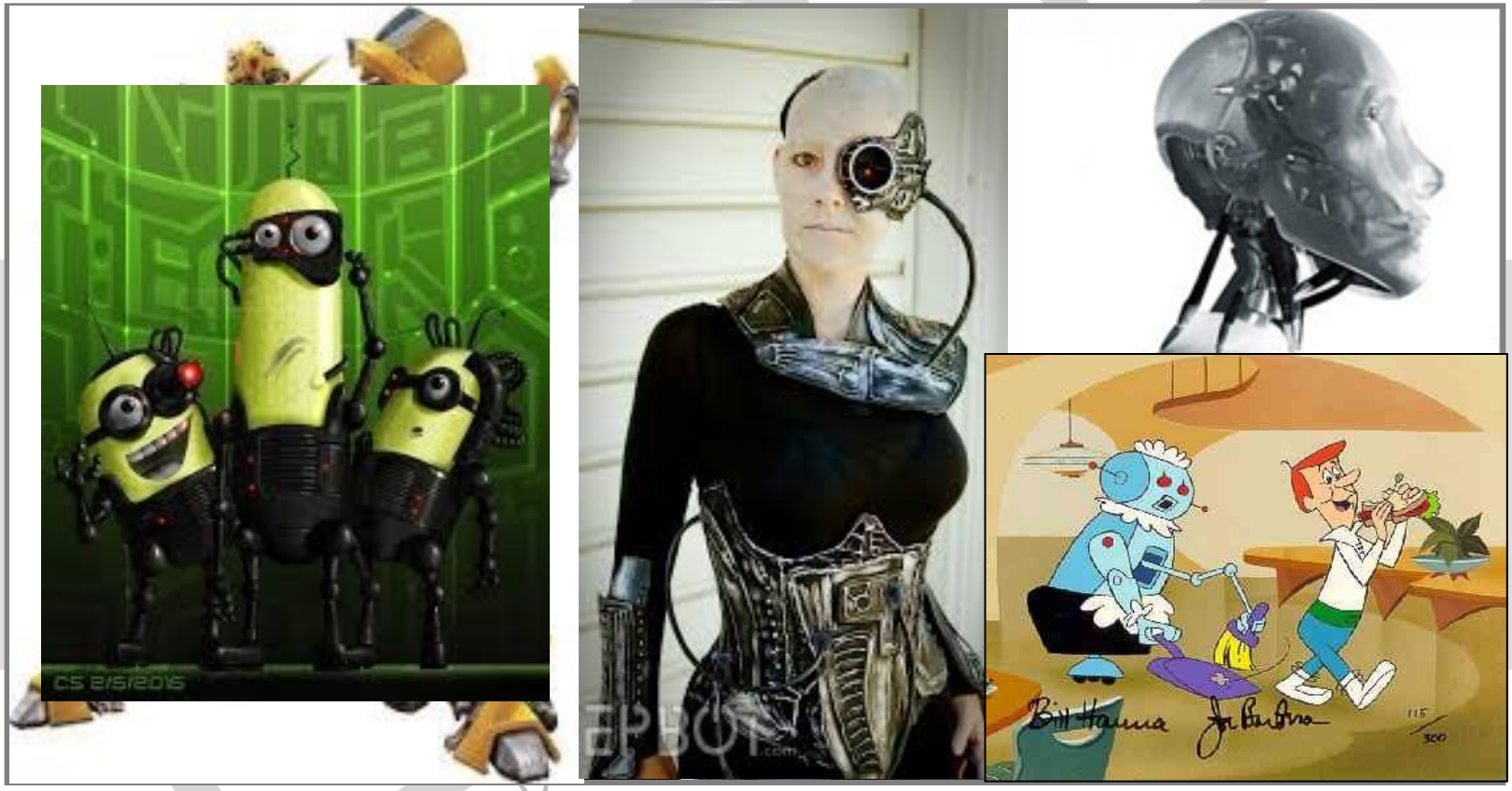
Robótica ONTEM!!

BMW plant in Leipzig - Germany



https://www.youtube.com/watch?v=MypOFnPDUo0

Robótica Amanhã...







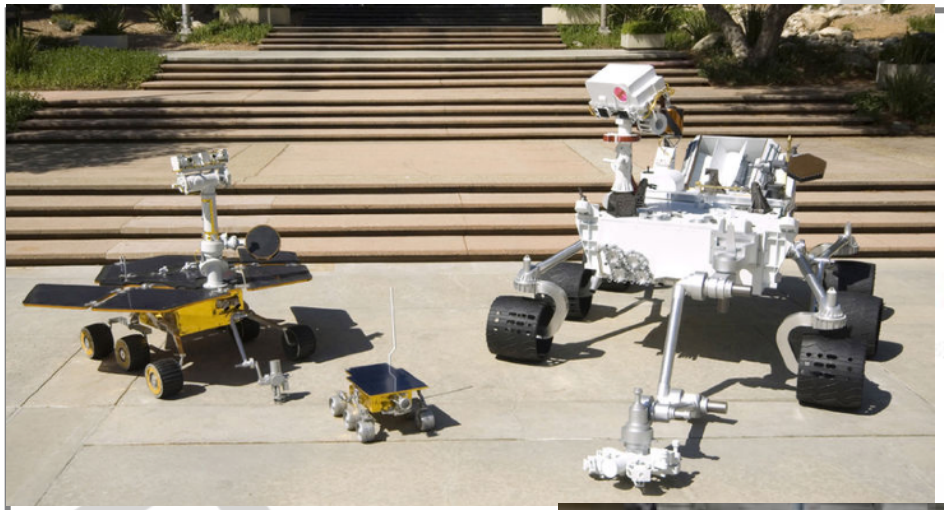
Rose - Jetsons Family

(1960's - Hanna-Barbera)

https://www.youtube.com/watch?v=xCiQIKtuB6A

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Robótica Hoje

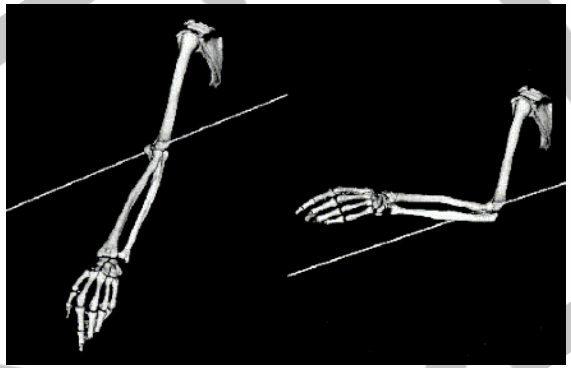
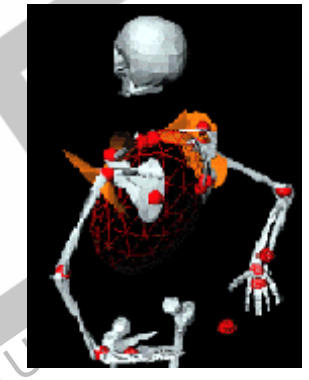
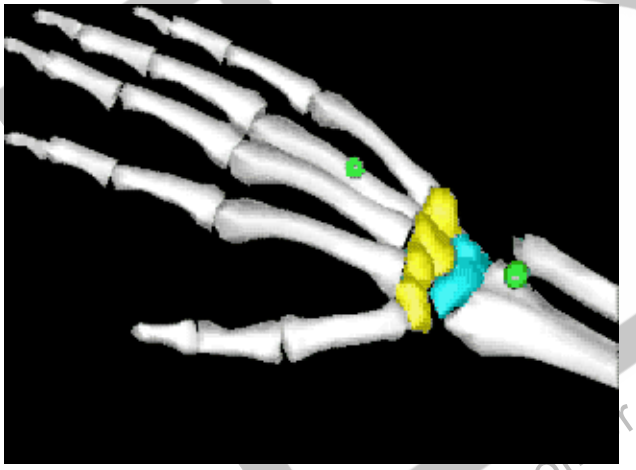
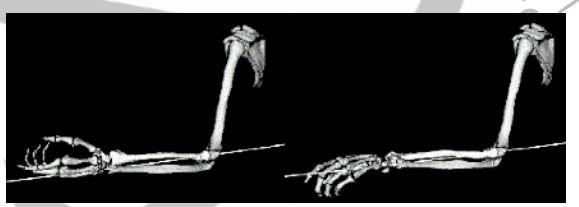
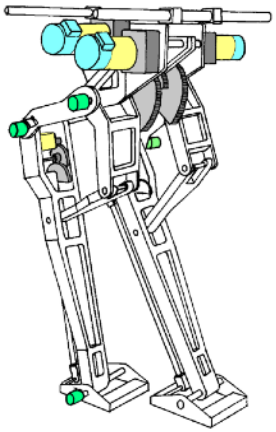




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Exemplos de Aplicação
Biomecânica





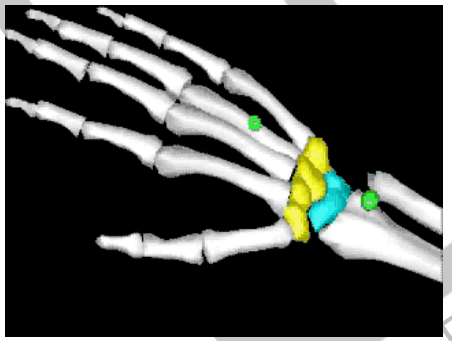
Perguntas?

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Próxima Aula

- Graus de Liberdade
- Cadeias Cinemáticas

- Pense: Quantos movimentos tem sua mão?



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