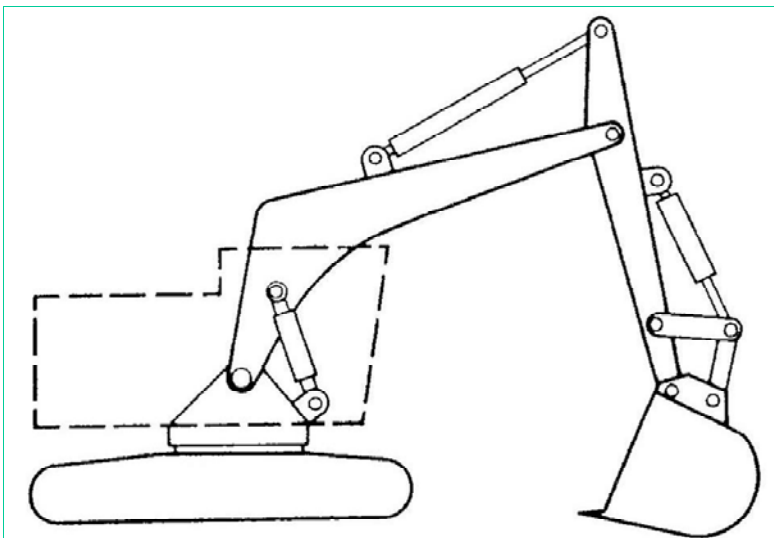


TMEC025 - Mecanismos

1-Introdução

Prof. Jorge Luiz Erthal

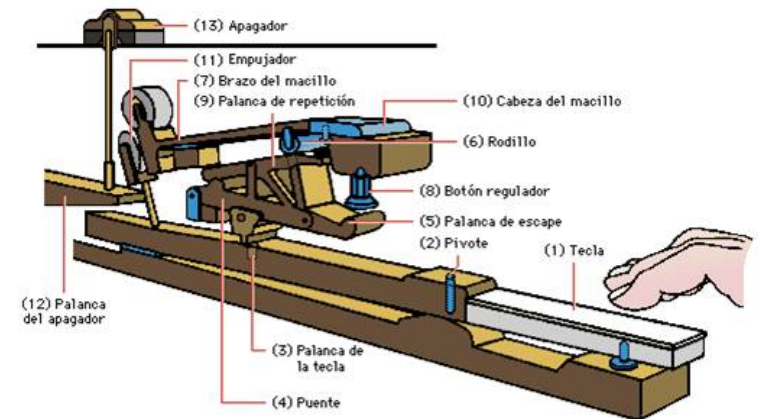
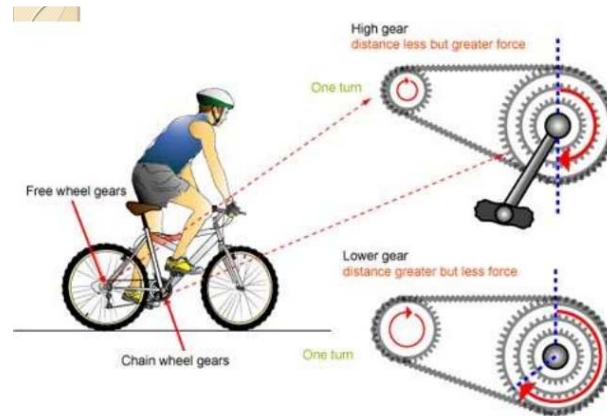
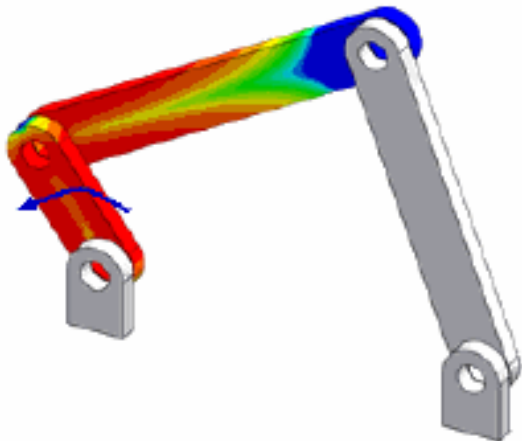
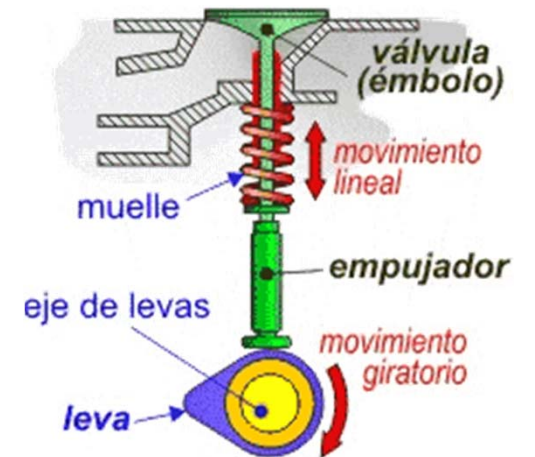
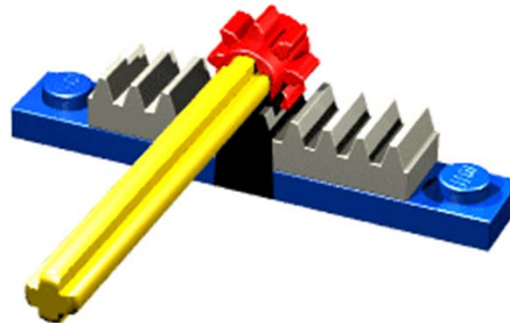
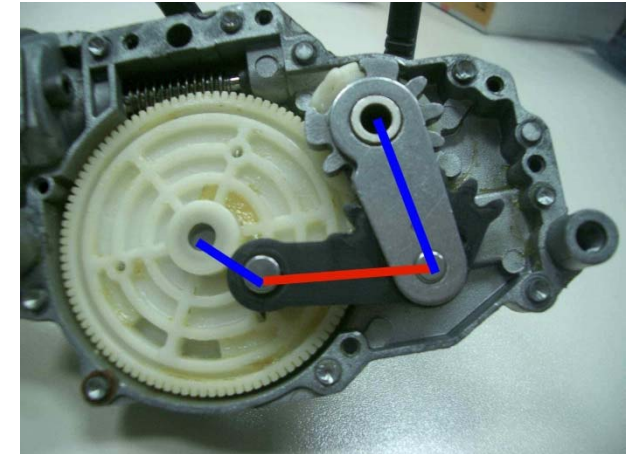
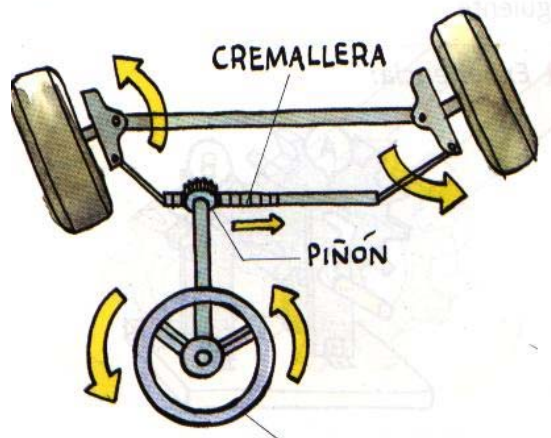
jorgeerthal@gmail.com



Nesta aula

- Conteúdo da disciplina
- Avaliações
- Recursos
- Plano de aula
- Material de apoio

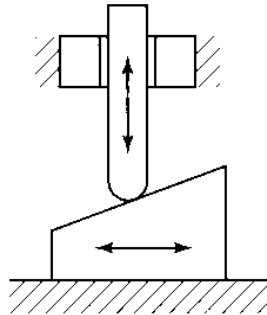
Panorama Geral



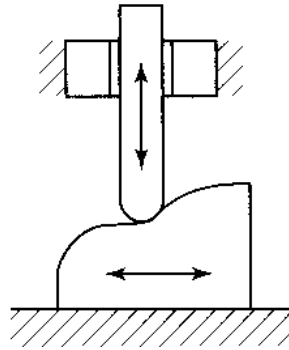
Tipos de movimento em mecanismos

Translação para Translação

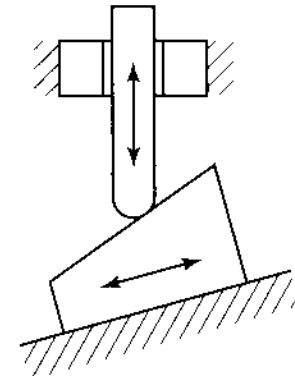
Wedge Cam Follower:
(Perpendicular)



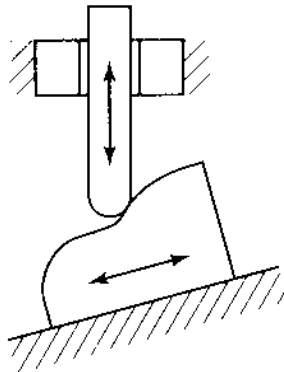
Wedge Cam Follower:
(Perpendicular)



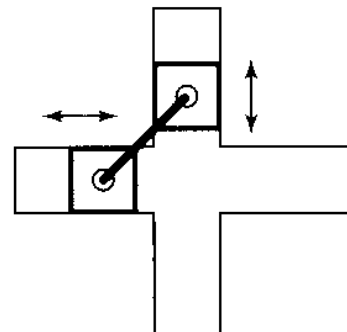
Wedge Cam Follower:
(Skew)



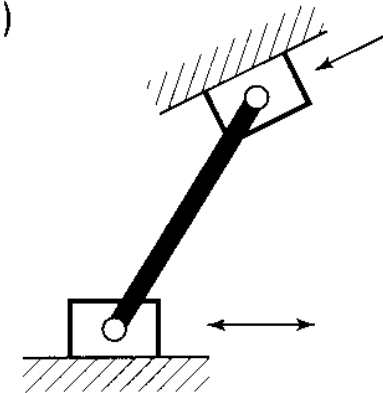
Wedge Cam Follower:
(Skew)



Double-slider:
(Perpendicular)



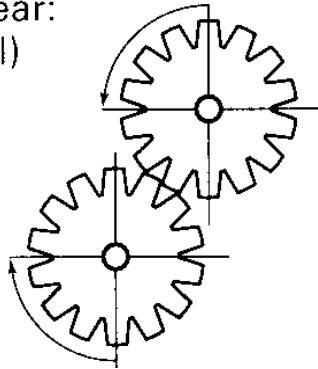
Double-slider:
(Skew)



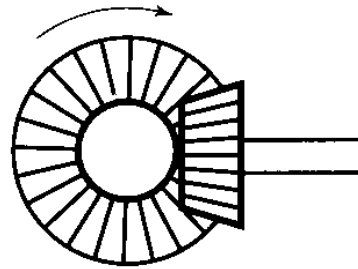
Tipos de movimento em mecanismos

Rotação para Rotação

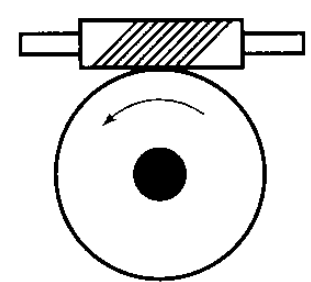
Spur Gear:
(Parallel)



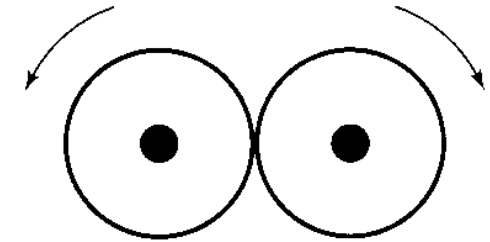
Bevel Gear:
(Perpendicular)



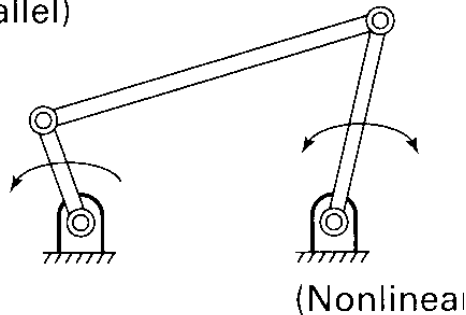
Worm Gear:
(Perpendicular)



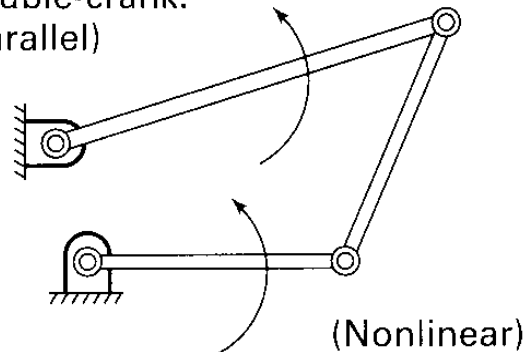
Friction Rollers Pair:
(Parallel)



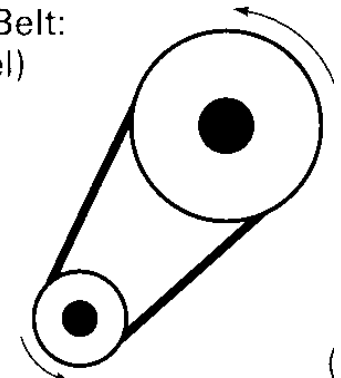
Crank-rocker:
(Parallel)



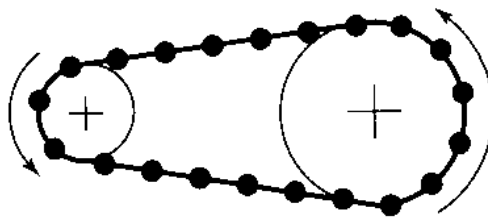
Double-crank:
(Parallel)



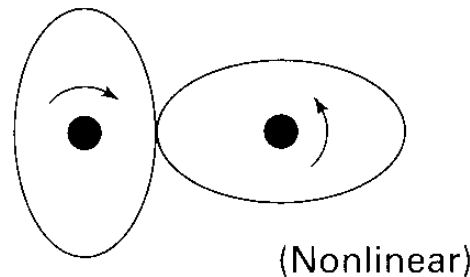
Pulley Belt:
(Parallel)



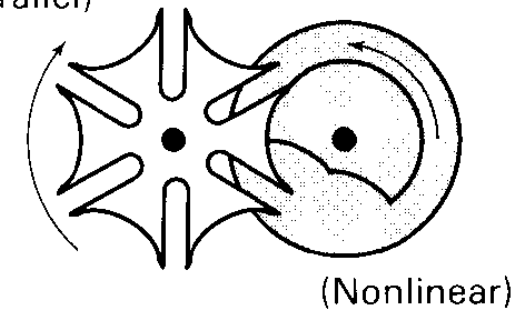
Sprocket and Chain:
Parallel)



Noncircular Gear:
(Parallel)



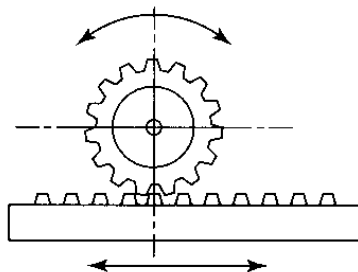
Geneva Wheel:
(Parallel)



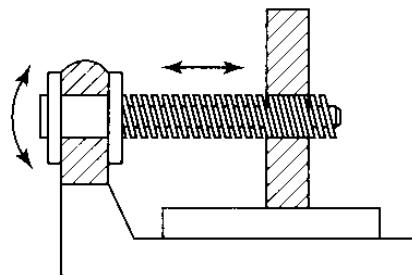
Tipos de movimento em mecanismos

Rotação para translação

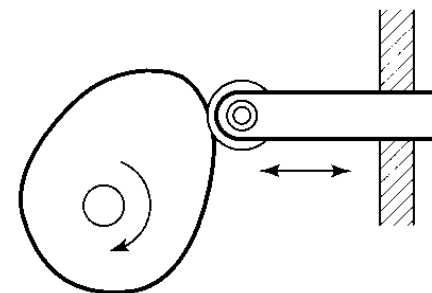
Rack-pinion:
(Perpendicular)



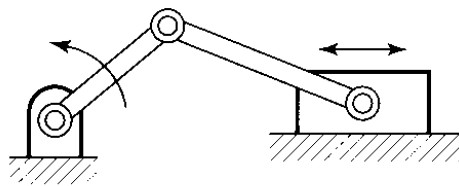
Screw Mechanism:
(Parallel)



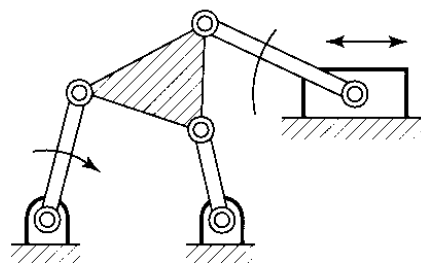
Cam Follower:
(Perpendicular)



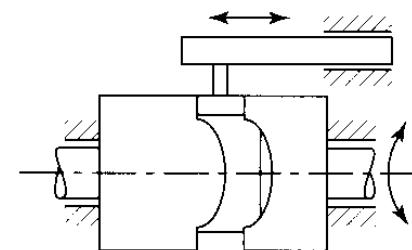
Slider-crank:
(Perpendicular)



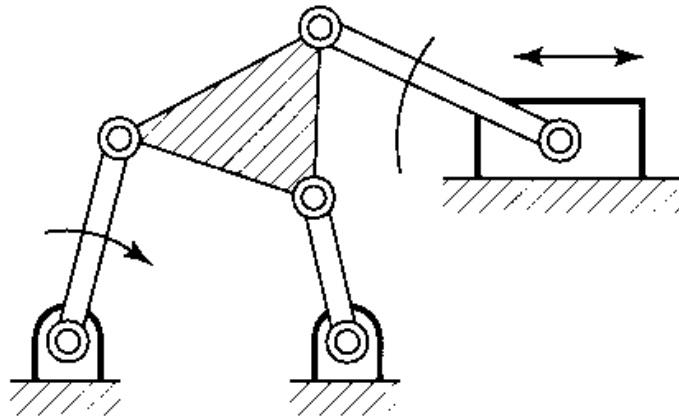
Six-bar Dwell Linkage:
(Perpendicular)



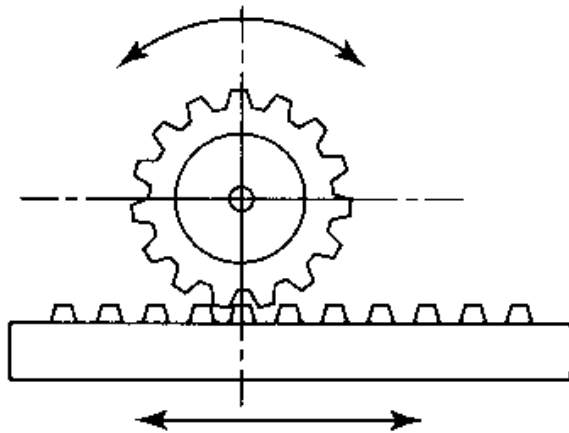
Cylindrical Cam Follower:
(Parallel)



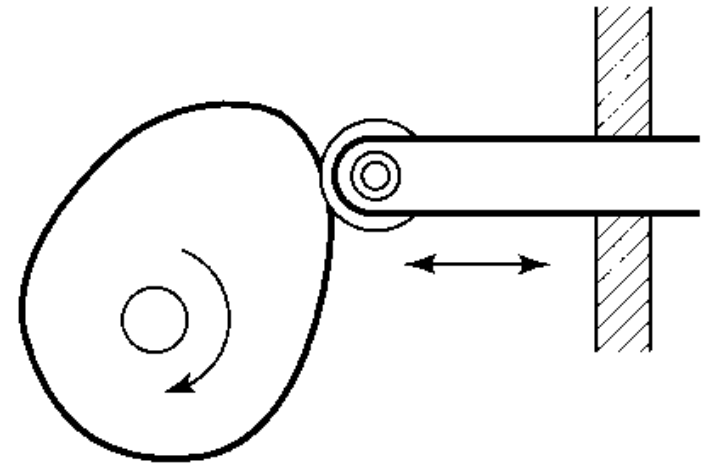
EXEMPLOS DE MECANISMOS



ARTICULADOS

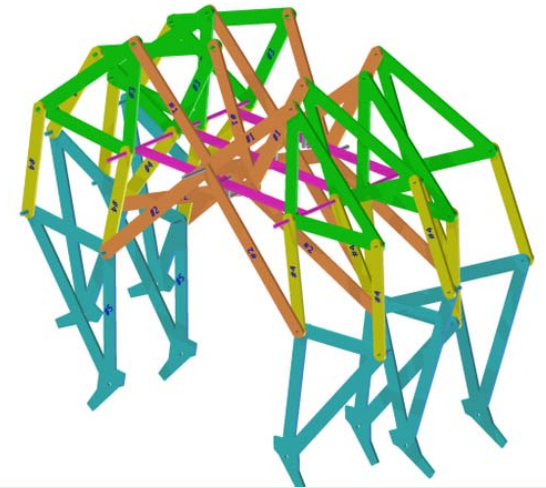


ENGRENAGENS



CAMES

Mecanismos Articulados

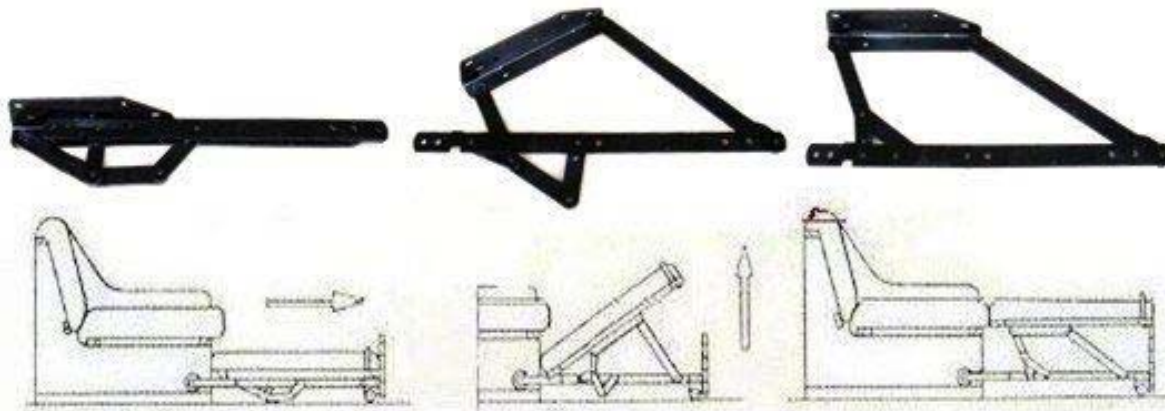


[Tribute to Theo Jansen's kinetic sculptures](#)

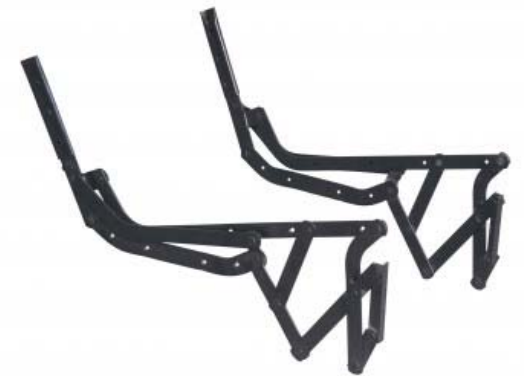


[Beach Animals, The Strandbeest](#)

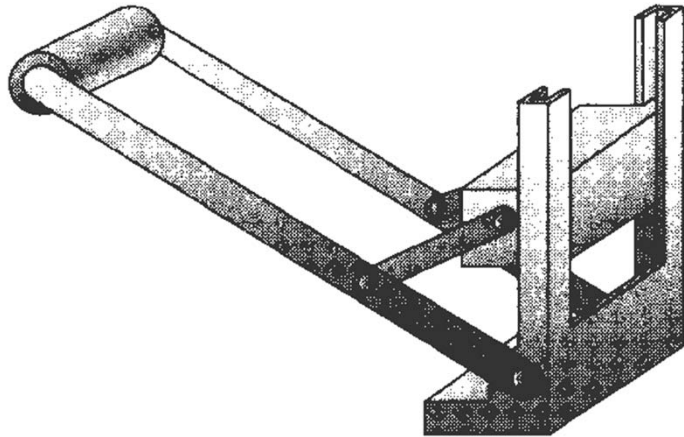
Mecanismos Articulados



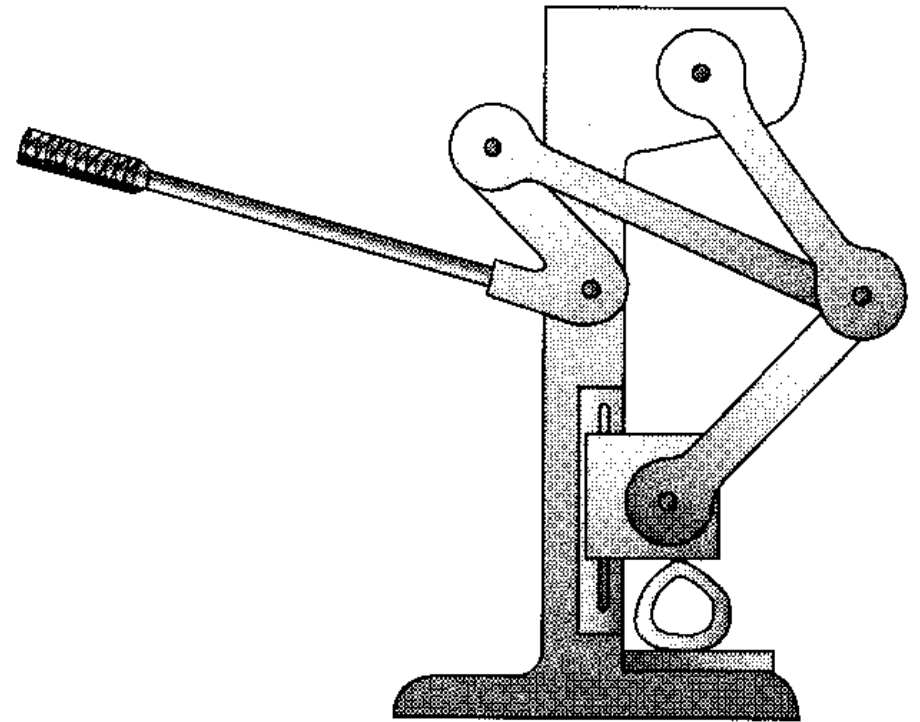
Móveis



Mecanismos articulados



Amassador de latas



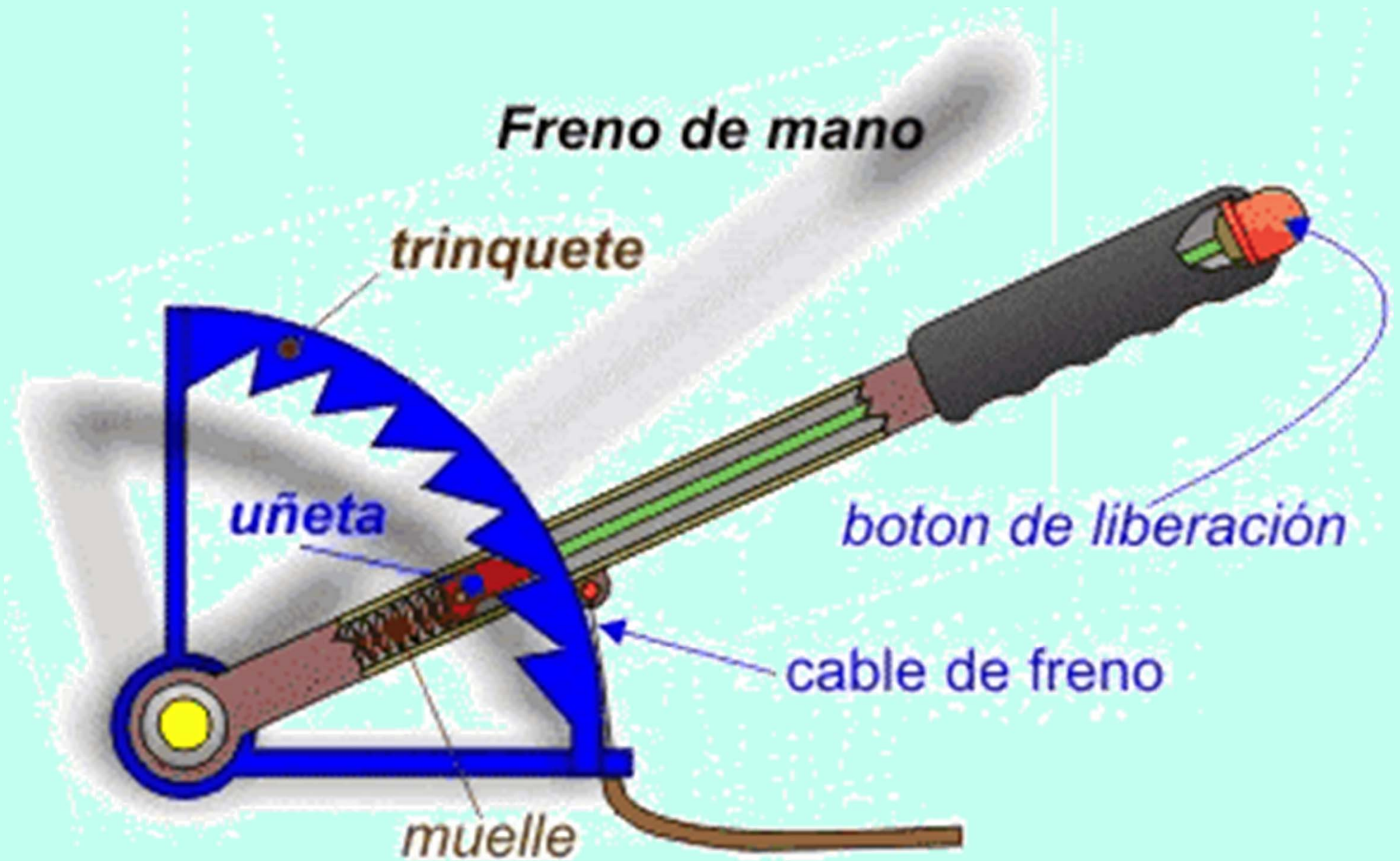
Prensa

Mecanismos articulados

Industria Automotiva

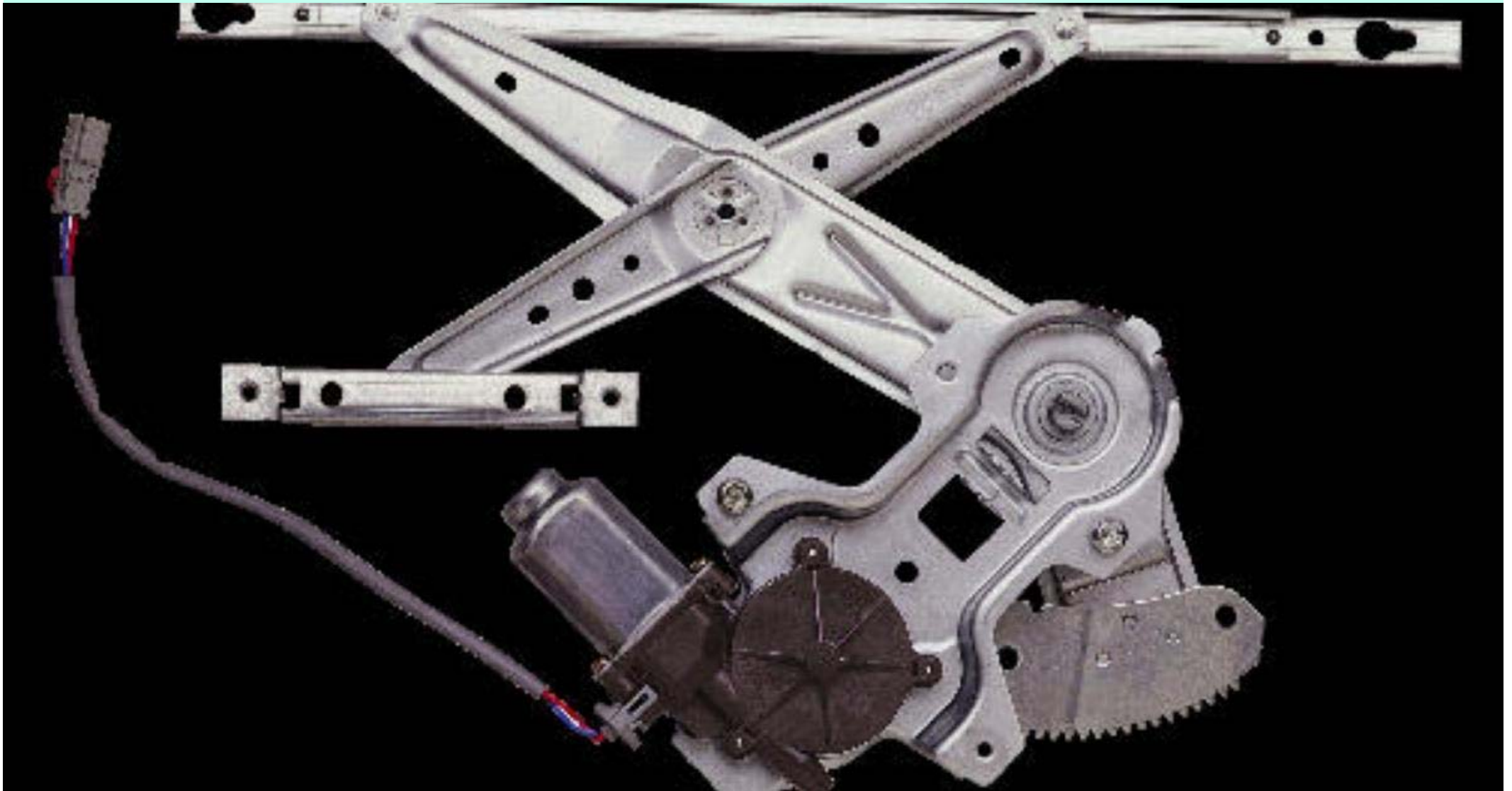


Mecanismos articulados



Freio de estacionamento

Mecanismos articulados



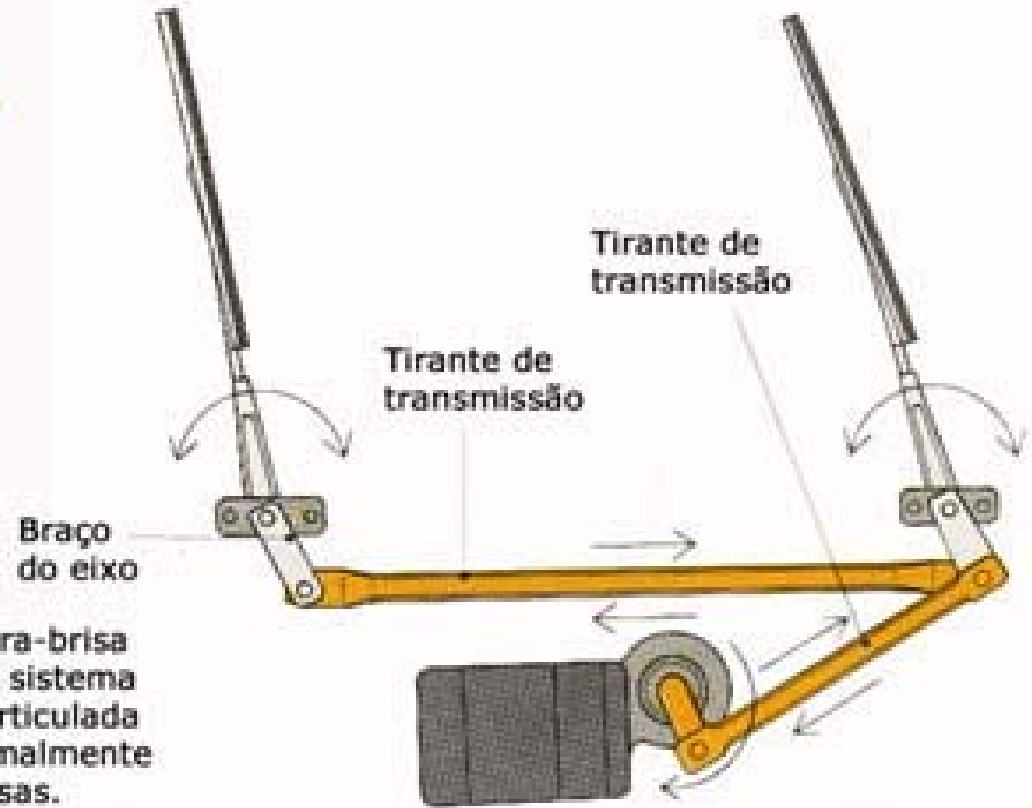
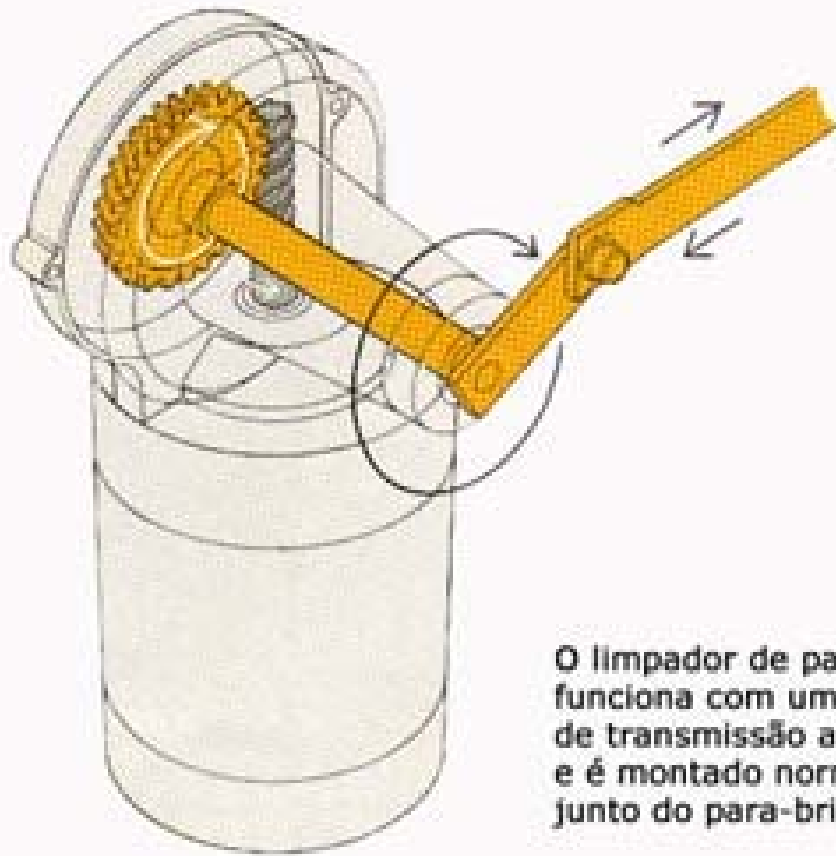
Acionamento do vidro

Mecanismos articulados



Capota conversível

Mecanismos articulados



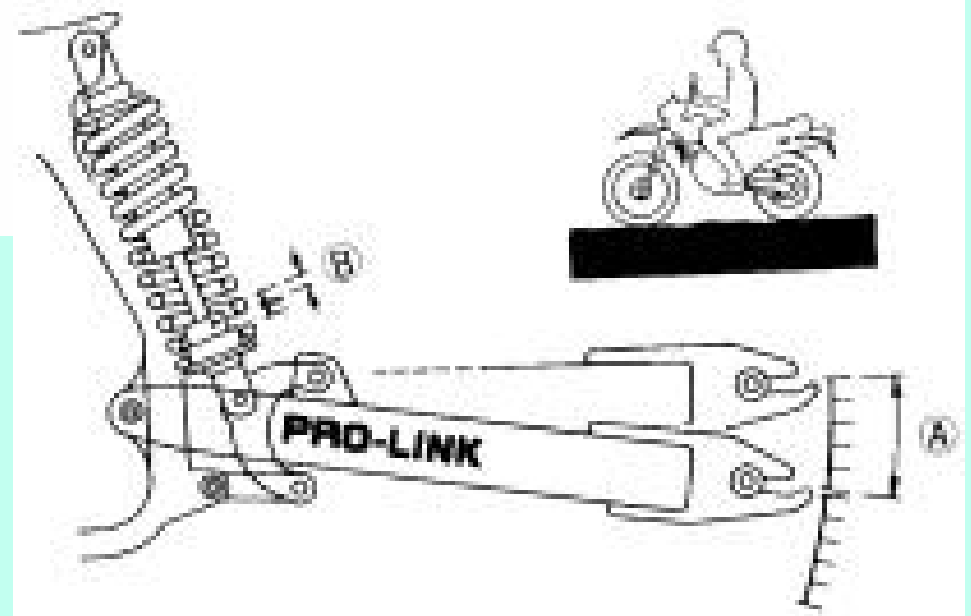
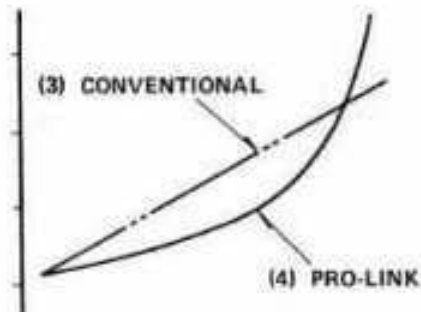
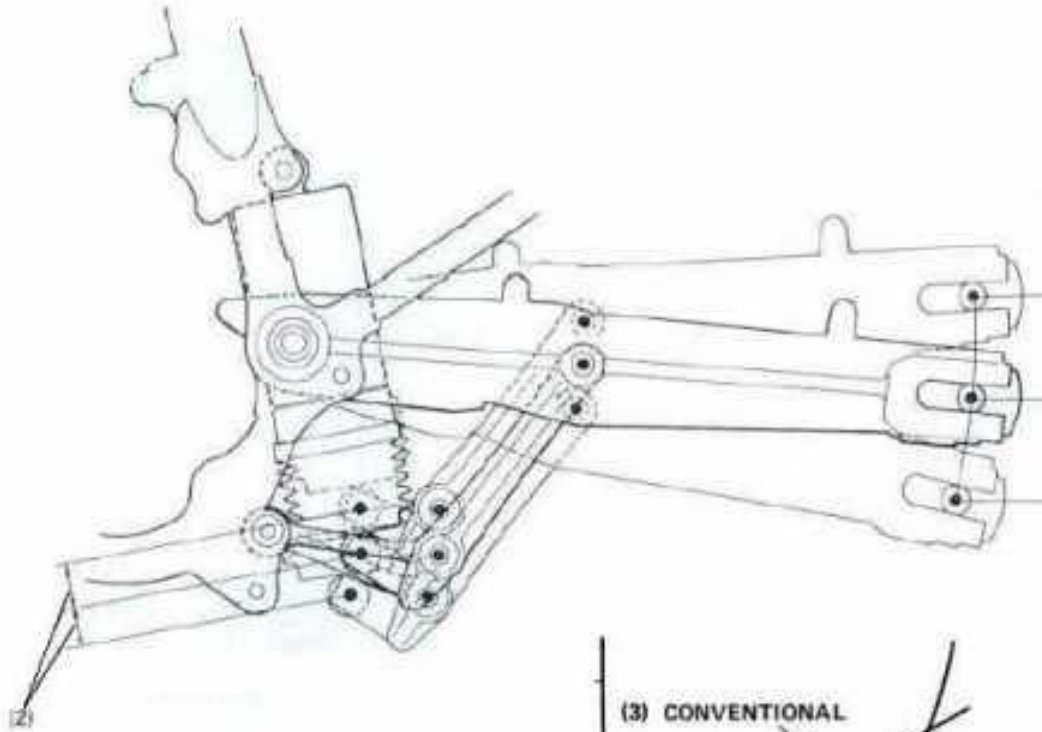
Limpador do para-brisa

Mecanismos articulados



Suspensão

Mecanismos articulados

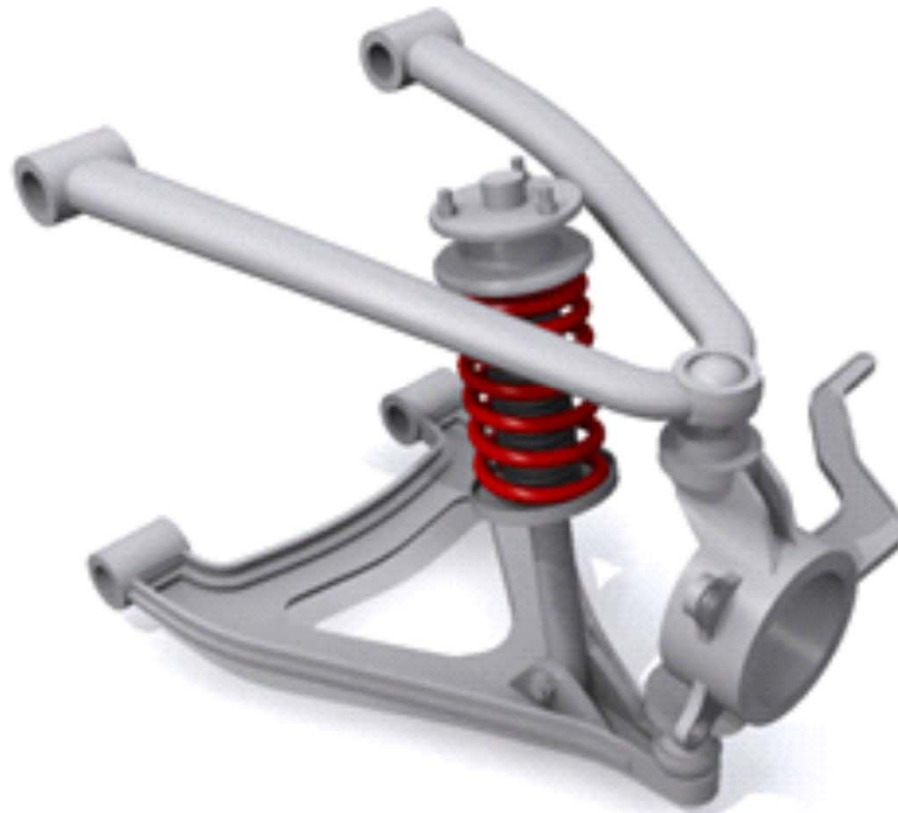


Suspensão

Mecanismos articulados



Suspensão McPherson



Suspensão Duplo A

Mecanismos articulados



Suspensão McPherson
(dianteira)



Suspensão de Braços
Arrastados (traseira)

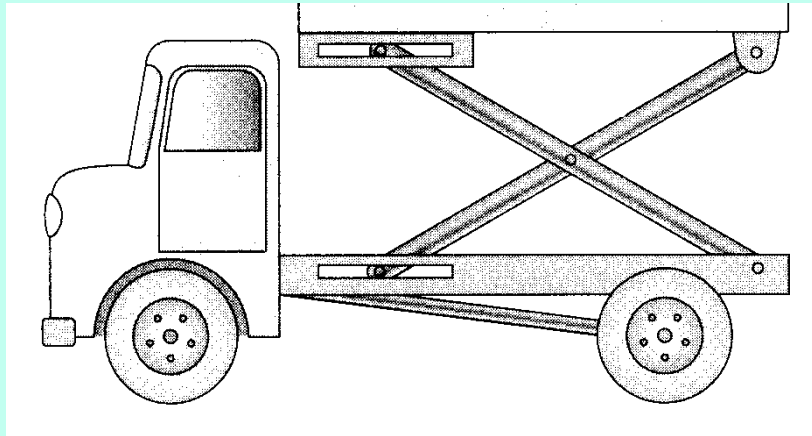


Mecanismos articulados

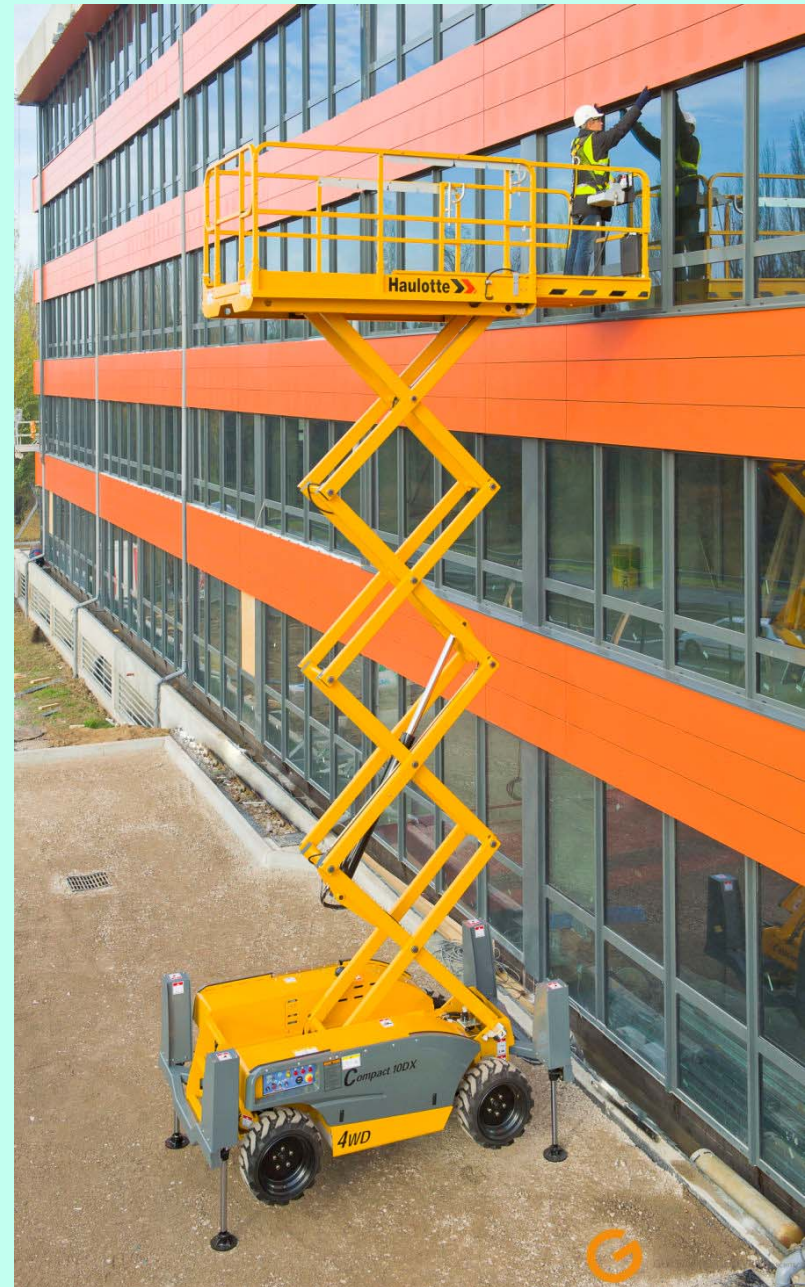


Suspensão / direção

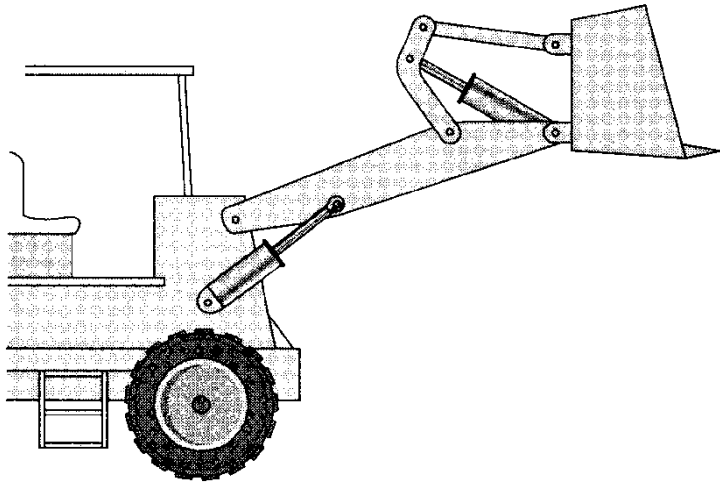
Mecanismos articulados



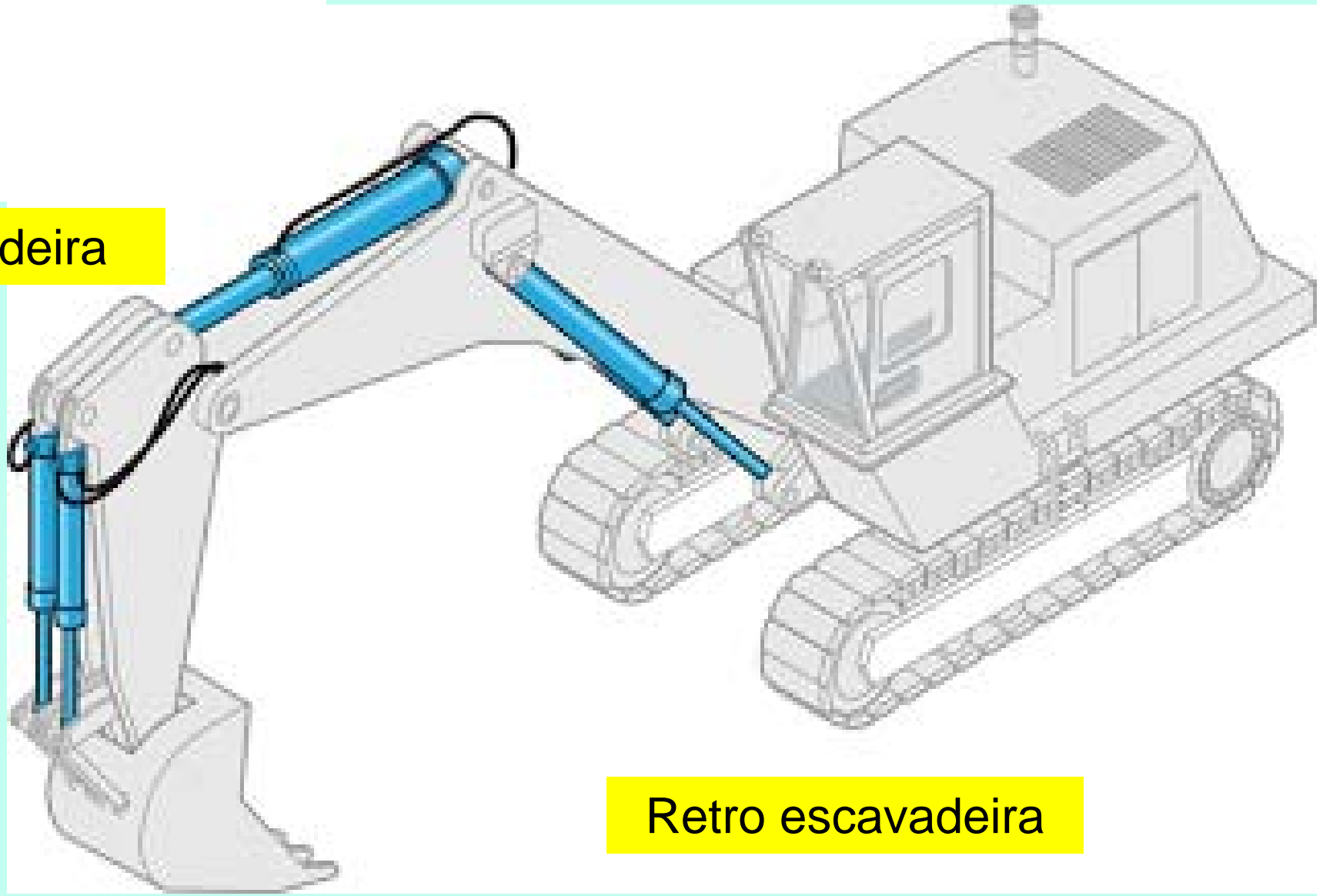
Plataformas de
elevação



Mecanismos articulados

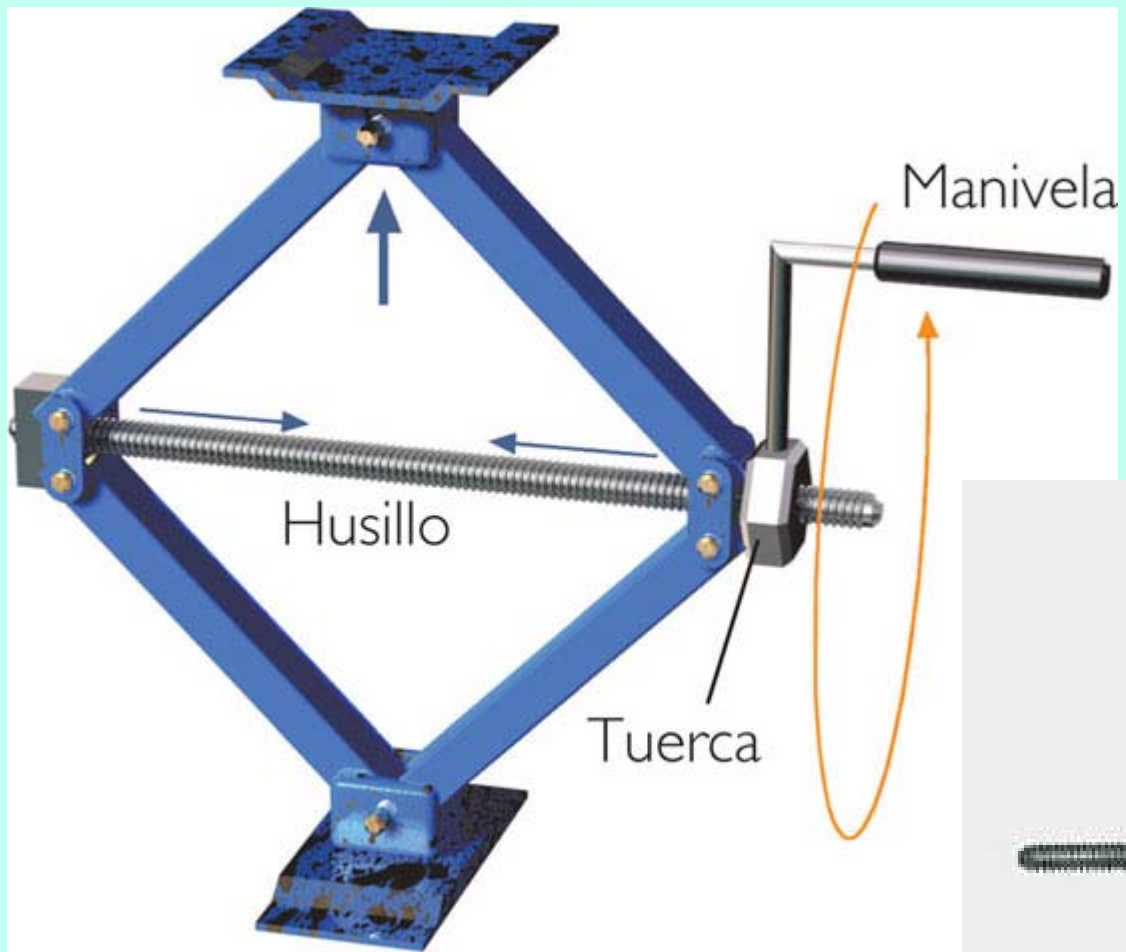


Pá Carregadeira



Retro escavadeira

Mecanismos articulados



Macaco

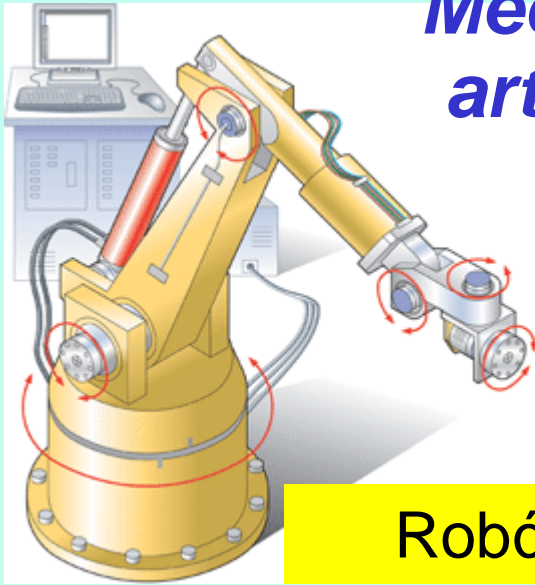


Mecanismos articulados



Equipamentos de ginástica

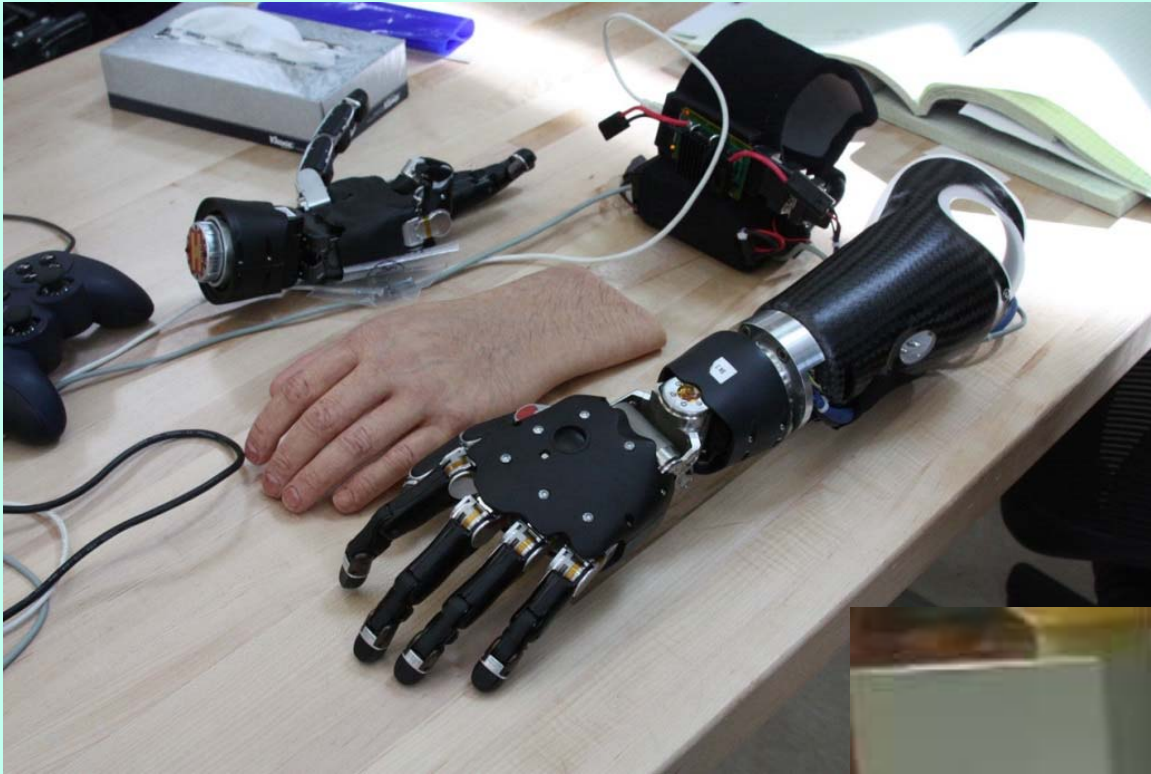
Mecanismos articulados



Robótica



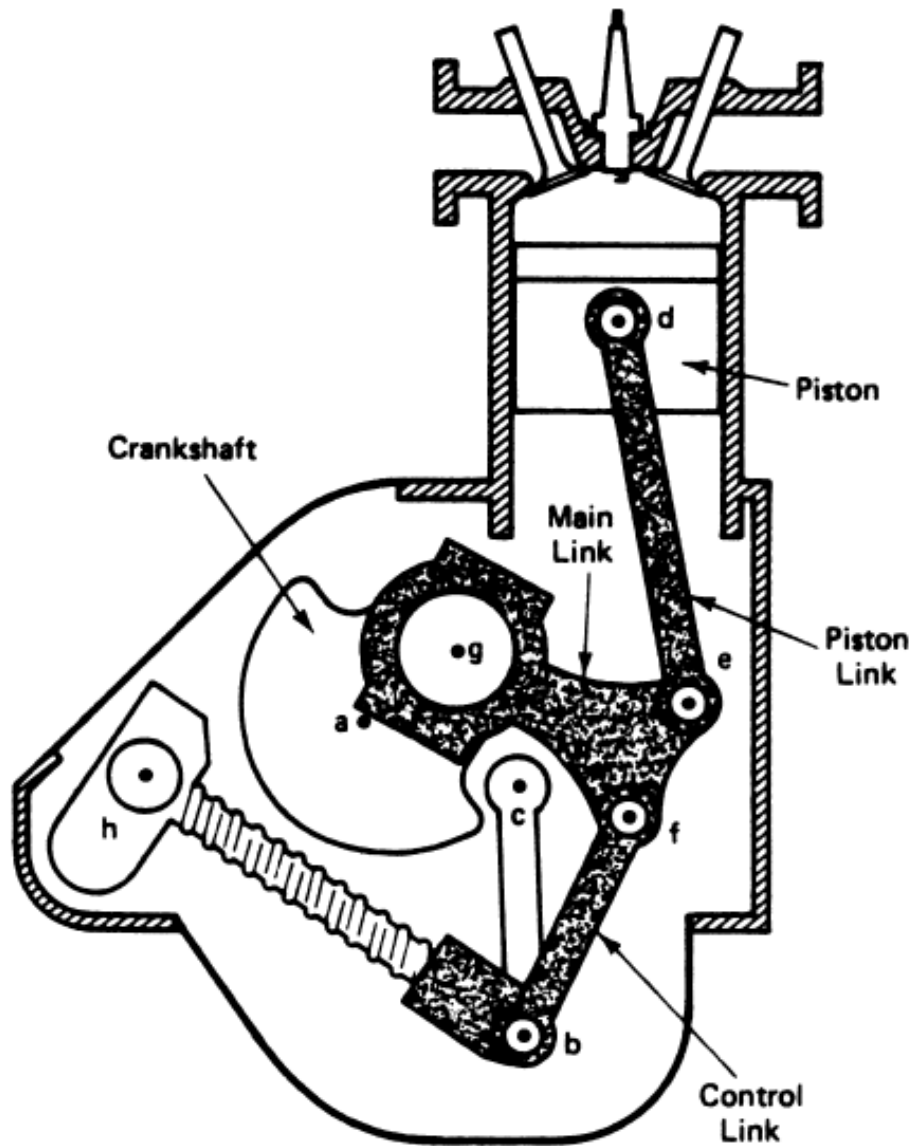
Mecanismos articulados



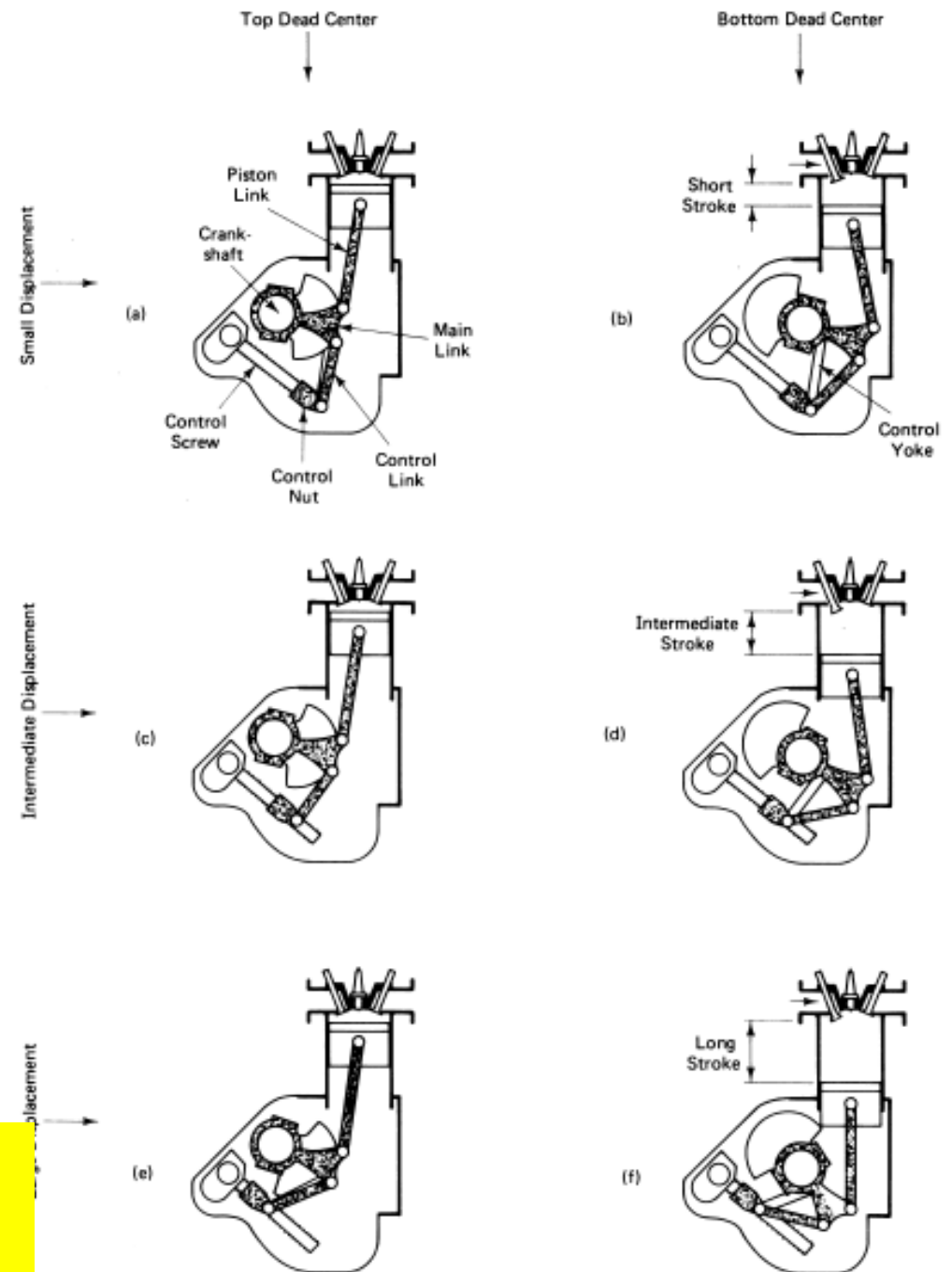
Biomecânica



Mecanismos articulados

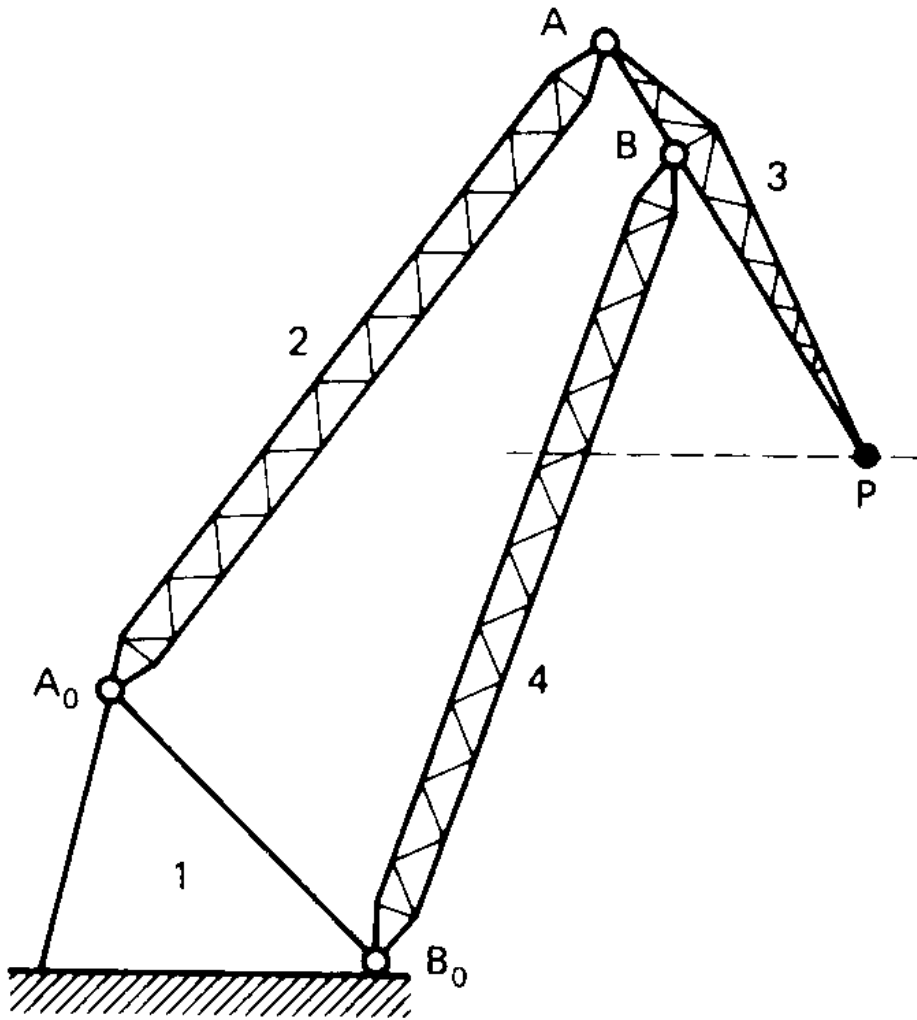


Motor de taxa de compressão variável



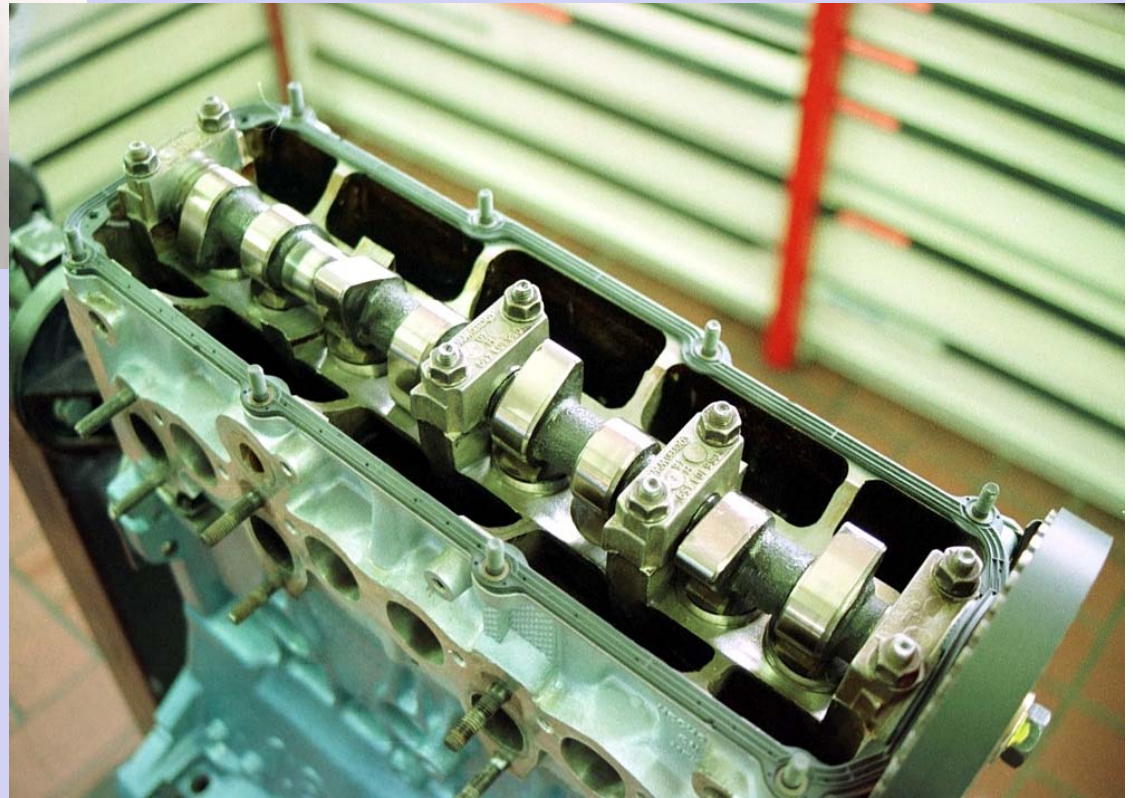
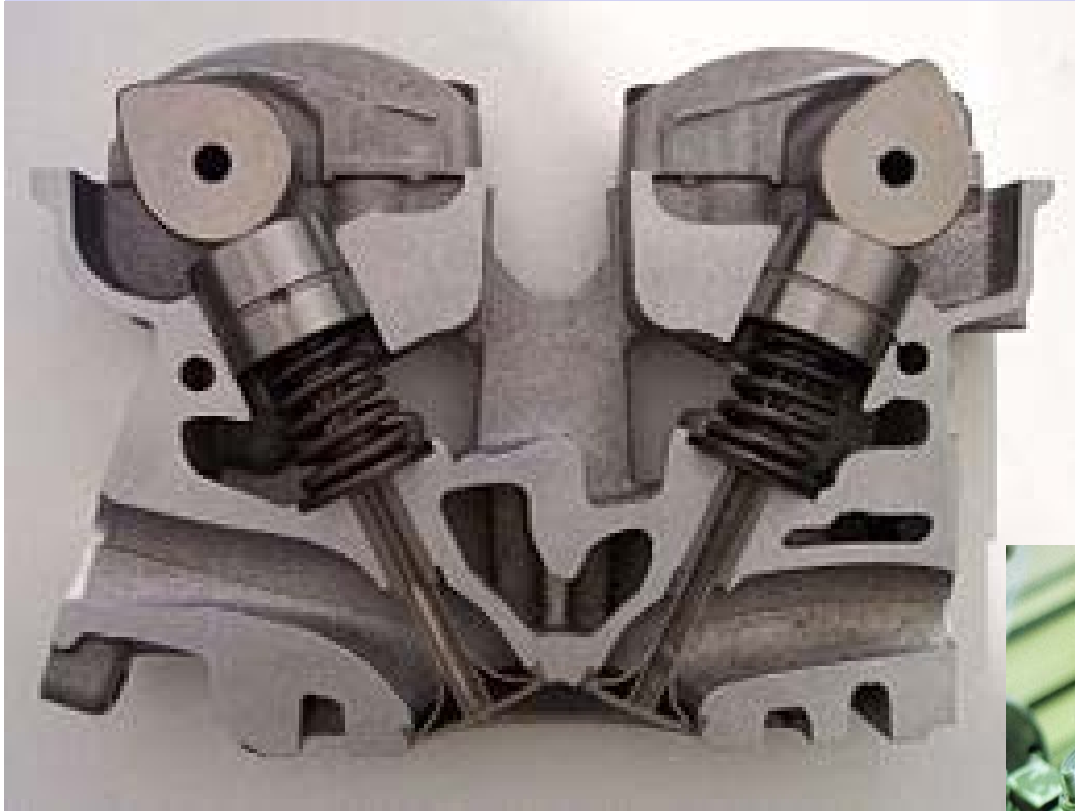
Mecanismos articulados

Interessa o percurso de um ponto isolado (**ponto de interesse**).

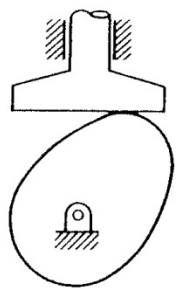


Guindaste – movimento em linha reta.

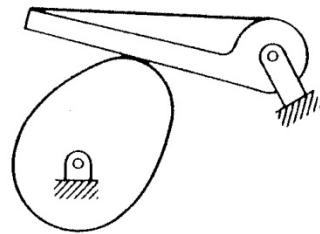
Cames



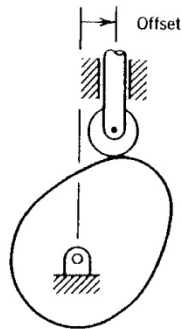
Cames



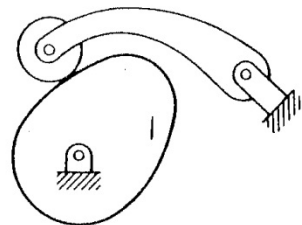
(a) Flat-faced, Translating Follower



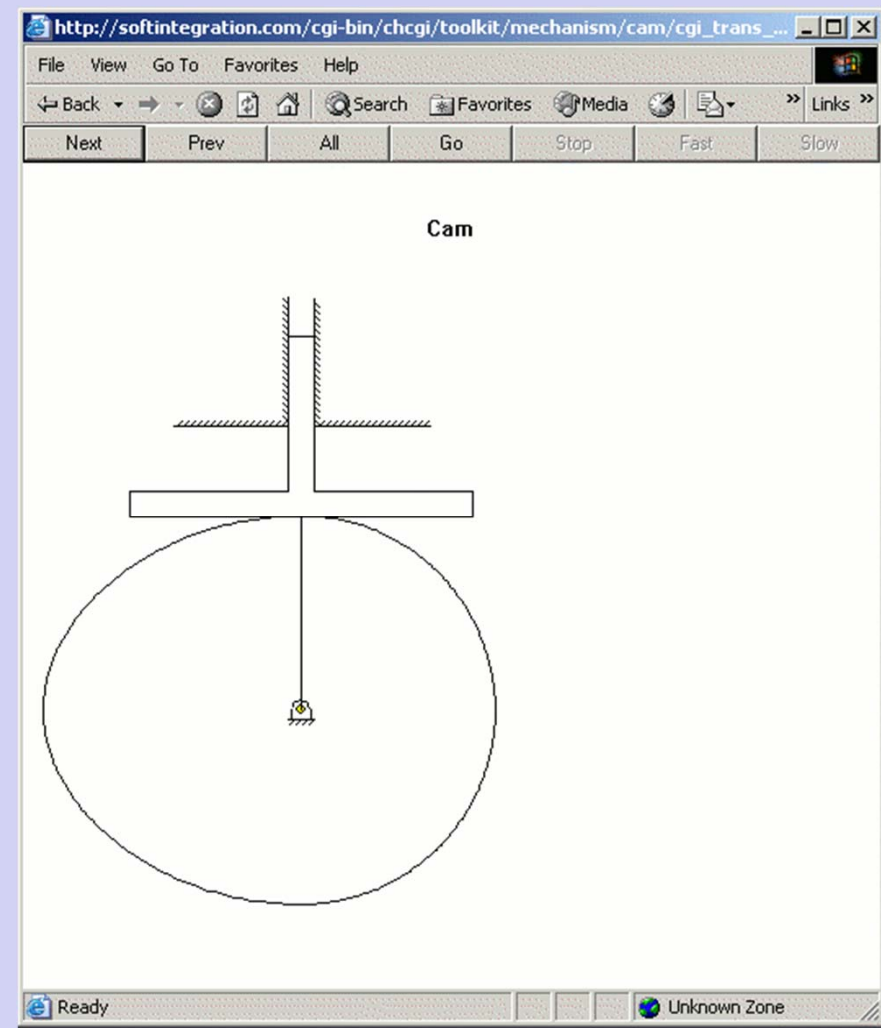
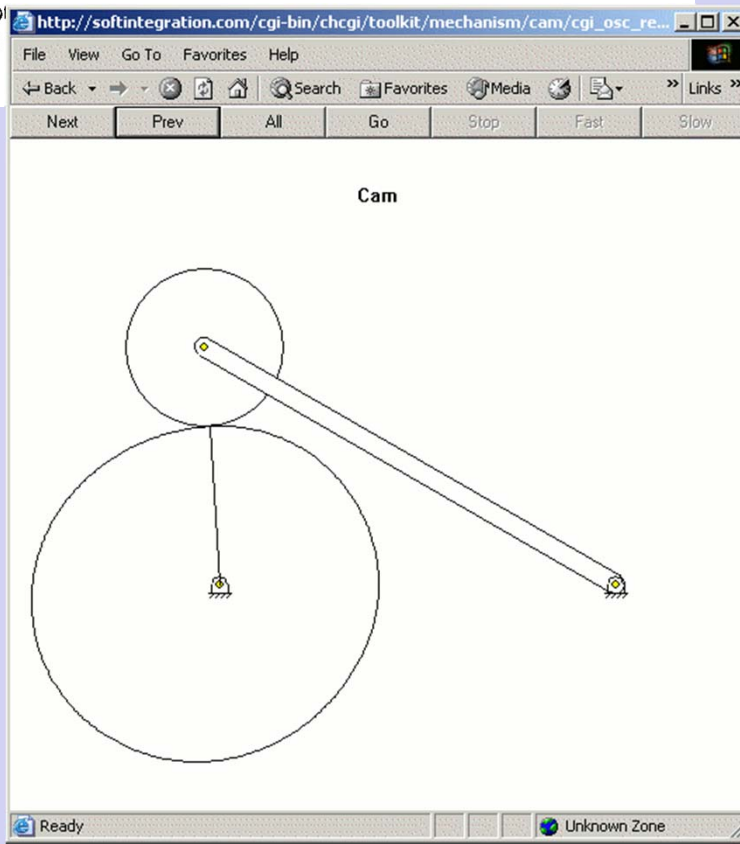
(b) Flat-faced, Pivoted Follower



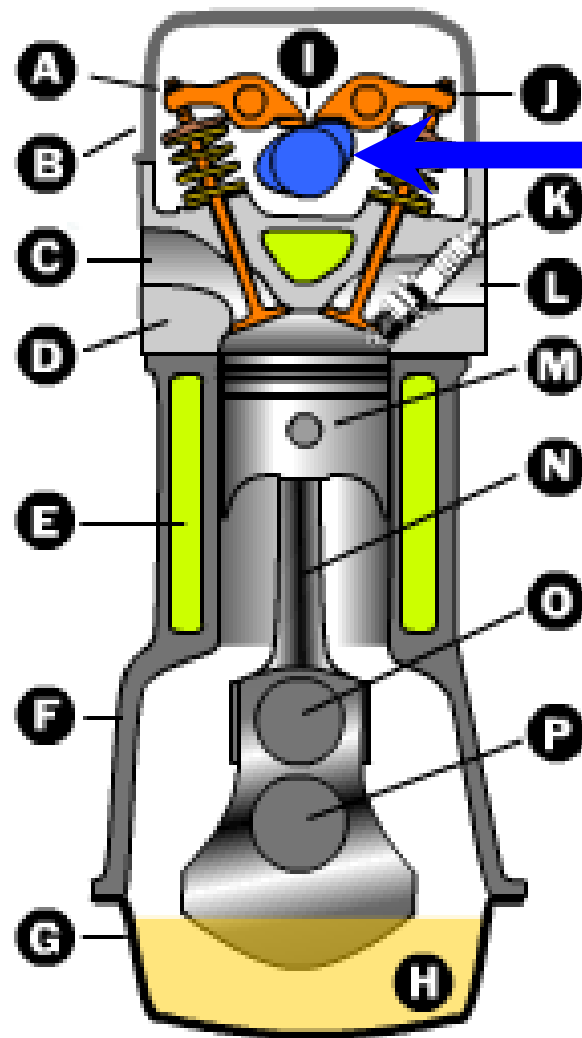
(c) Offset



FIGURE



Cames

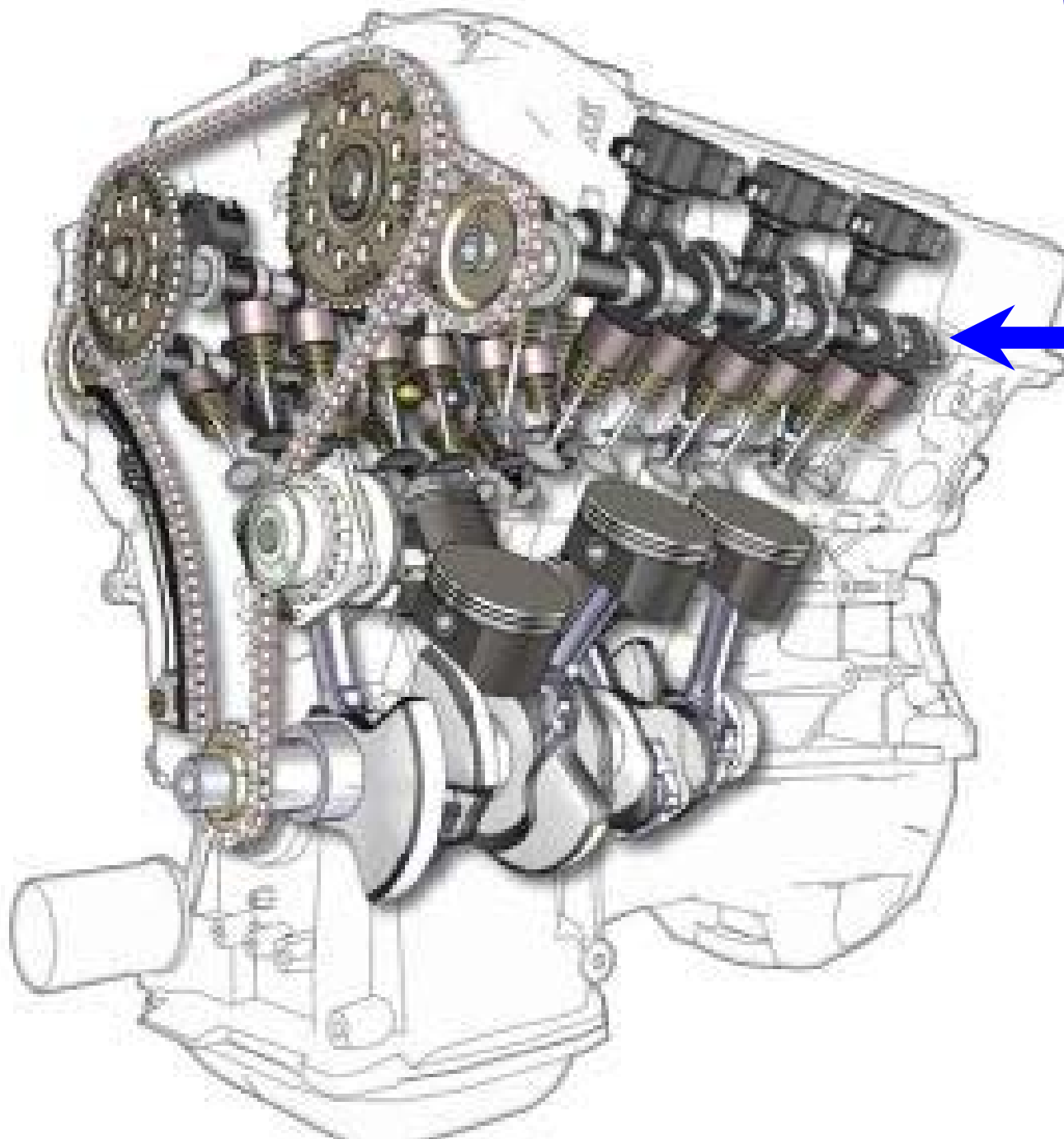


- | | |
|---|---|
| A Válvula de Admissão, Balancim e Mola | I Comando de válvulas |
| B Tampa de Válvulas | J Válvula de escape, Balancim e Mola |
| C Duto de Admissão | K Vela de Ignição |
| D Cabeçote | L Duto de escape |
| E Água | M Pistão |
| F Bloco do Motor | N Biela |
| G Câter | O Mancal de Biela |
| H Óleo | P Virabrequim |

-
- 1** ADMISSÃO
 - 2** COMPRESSÃO
 - 3** EXPLOSÃO
 - 4** EXAUSTÃO
 - ▲** Centelha
 - Ponto Morto Superior

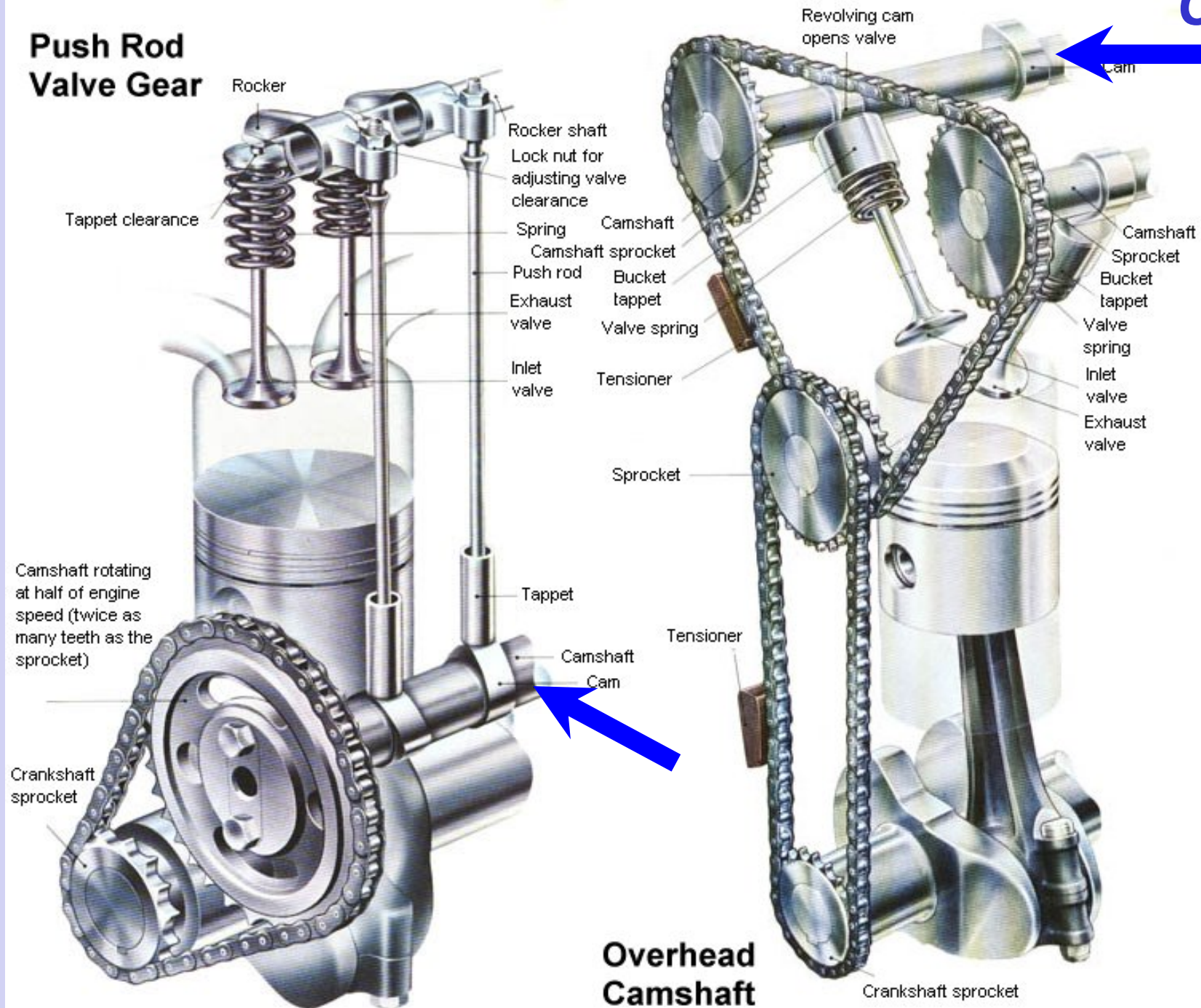
Motores de combustão interna

Cames

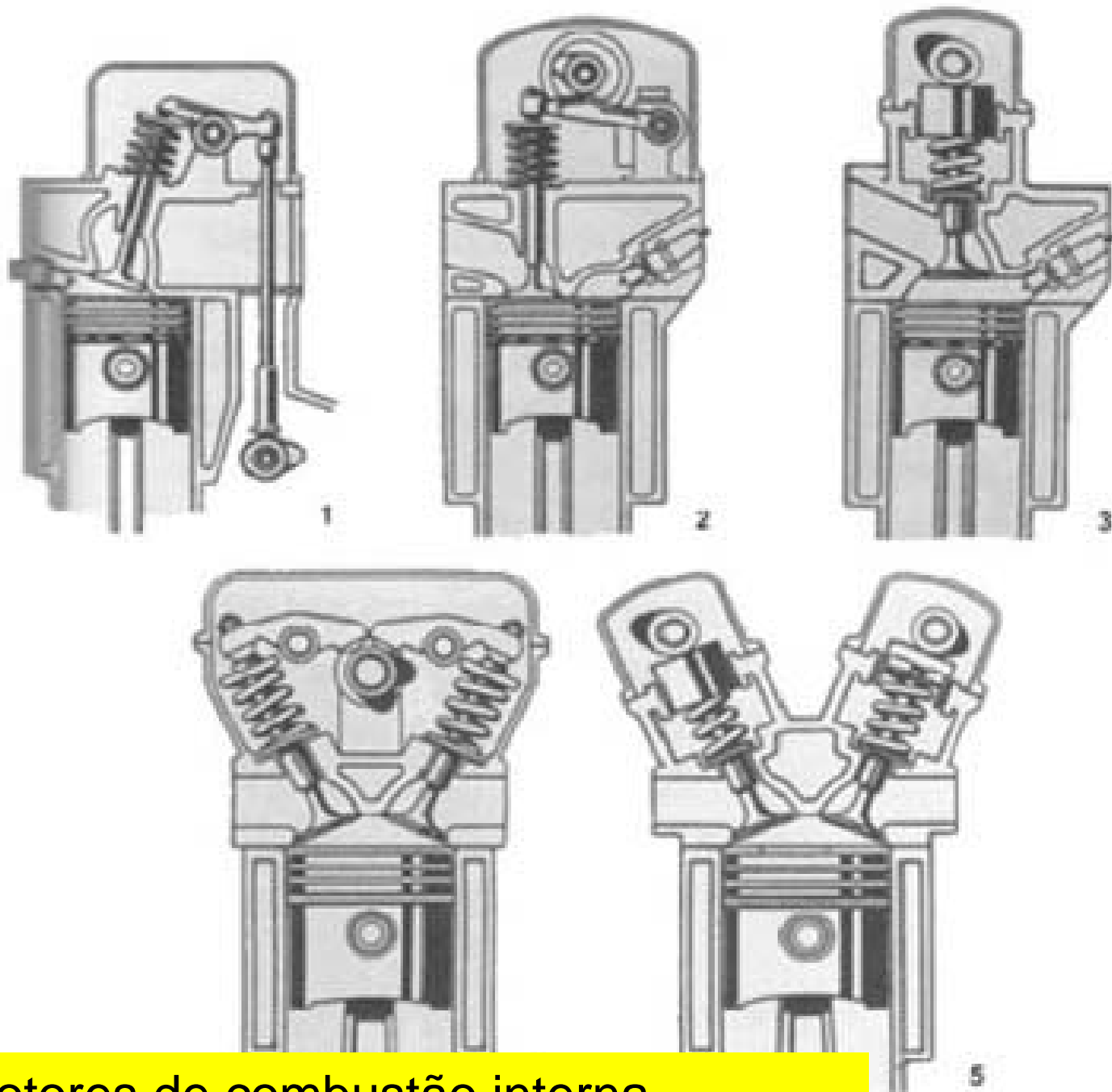


Motores de combustão interna

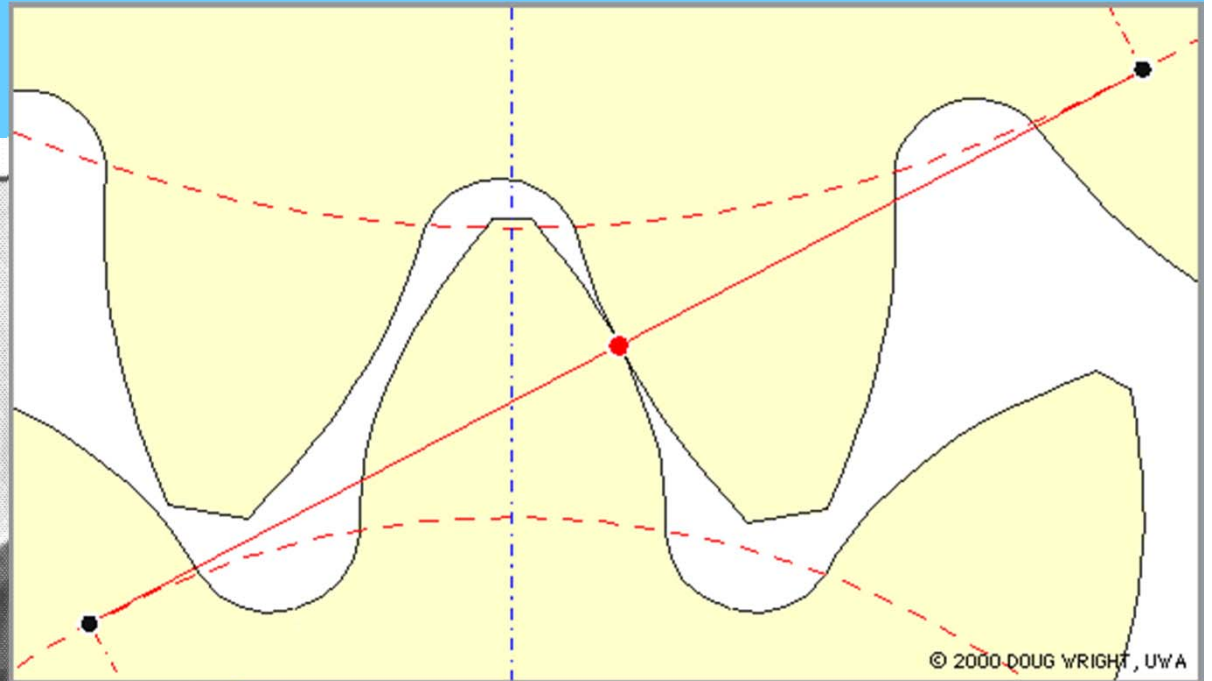
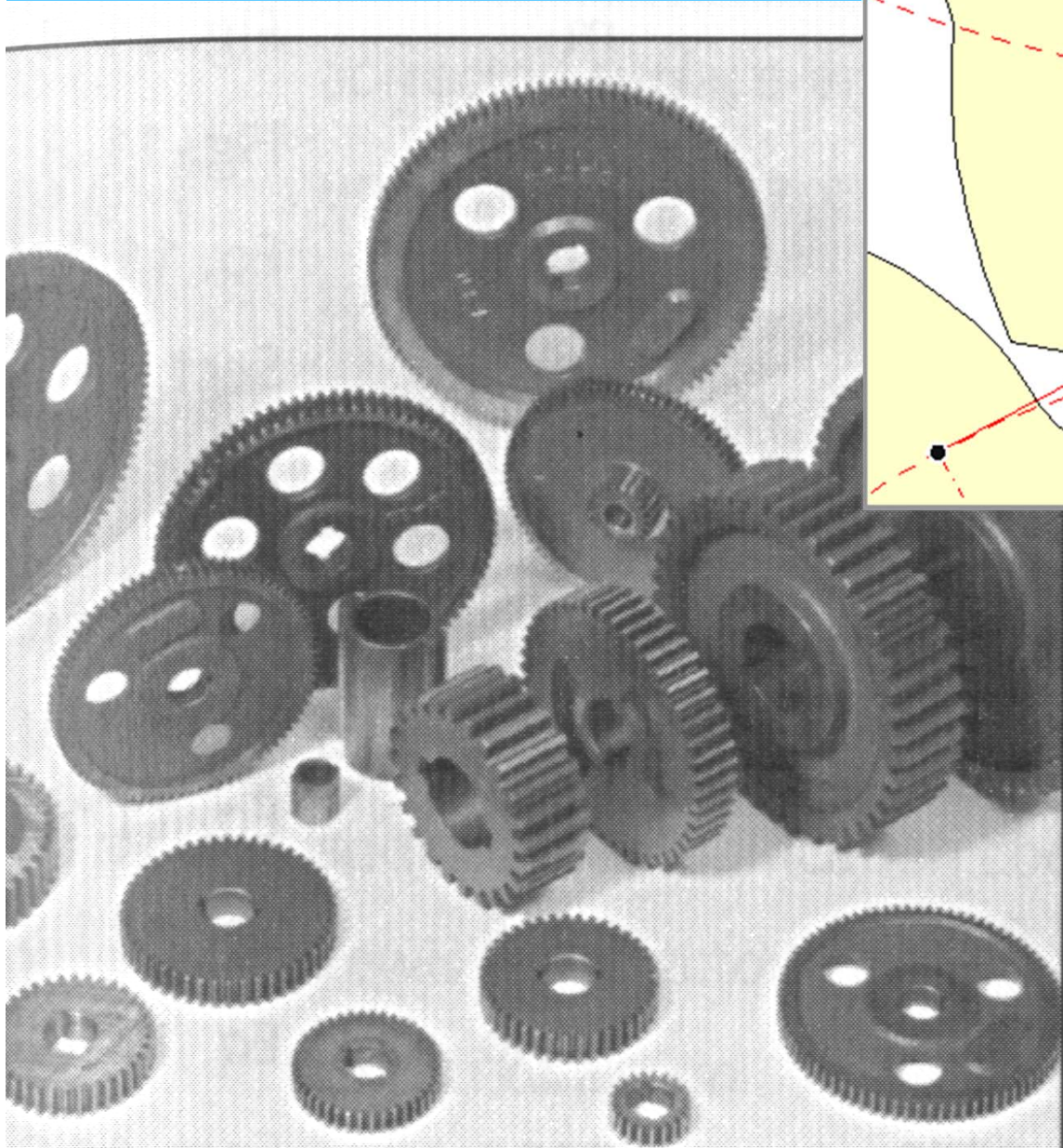
Push Rod Valve Gear



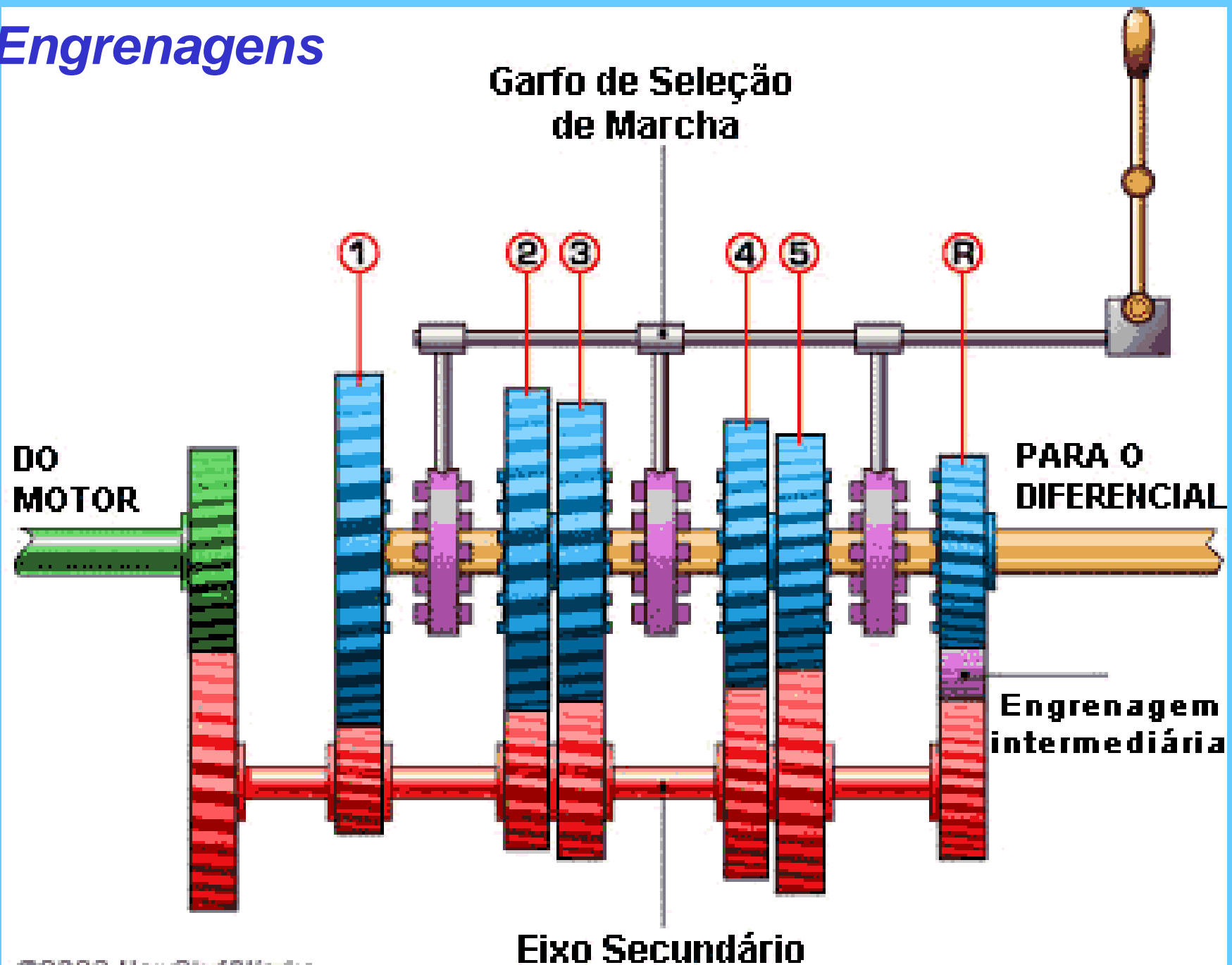
Overhead Camshaft



Engrenagens



Engrenagens



©2003 HowStuffWorks

Engrenagens



Transmissão

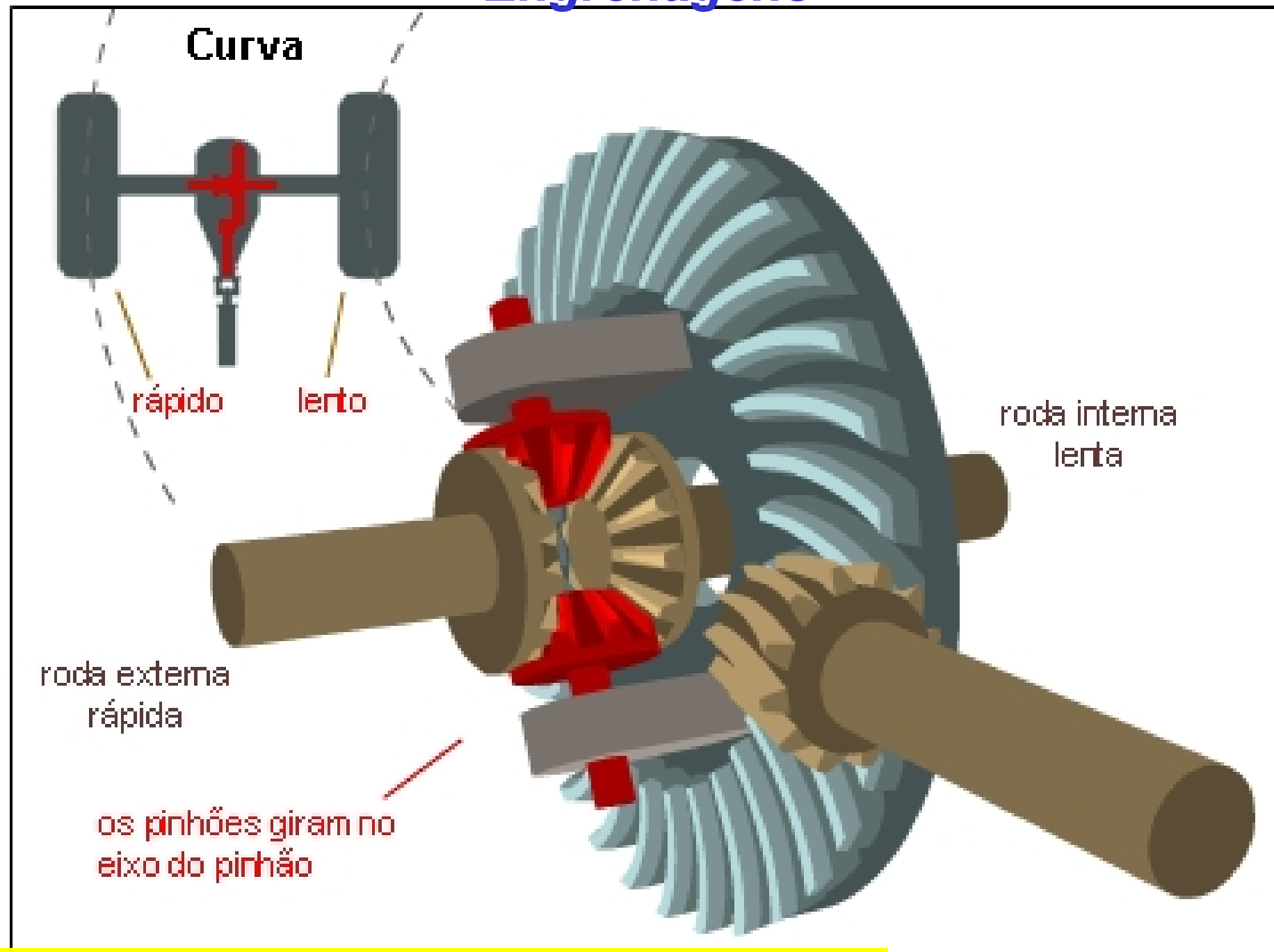
Engrenagens



notícias 
automotivas

Transmissão

Engrenagens

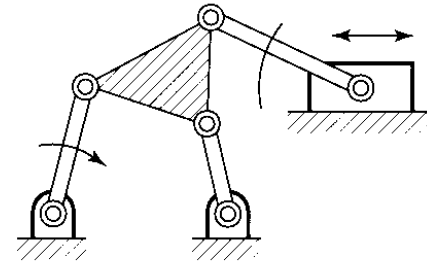


Transmissão - diferencial

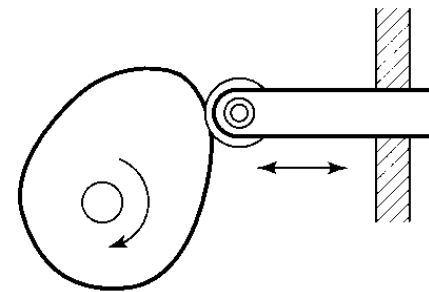
Conteúdo da disciplina

Análise e Síntese de mecanismos:

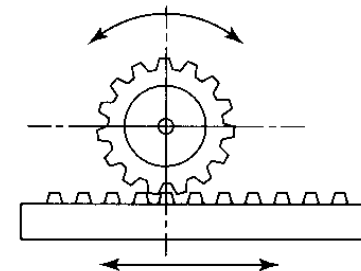
✓ Articulados



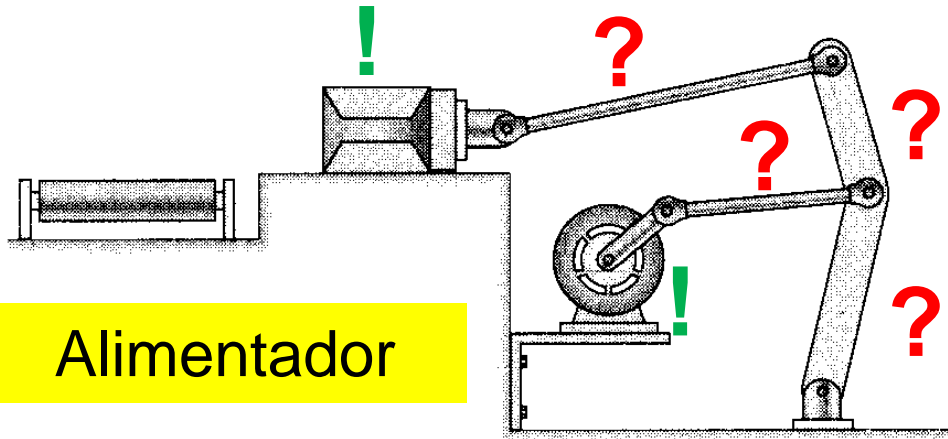
✓ Cames



✓ Engrenagens



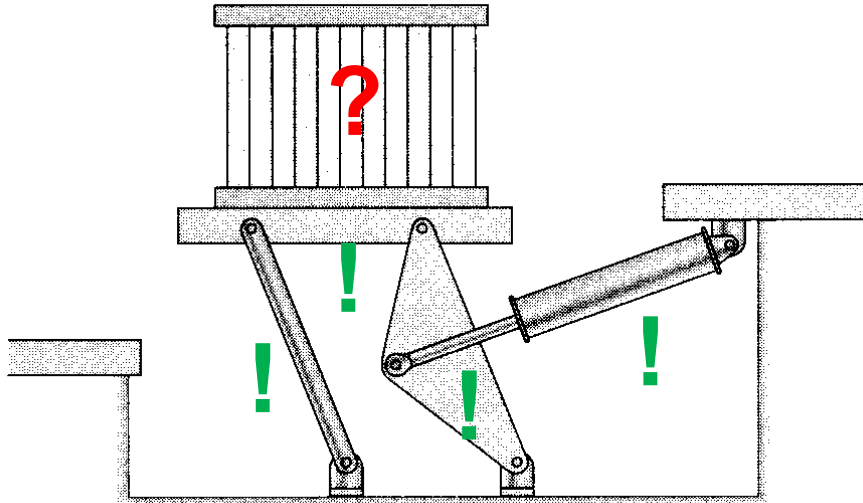
Síntese x Análise



Alimentador

Síntese:

Quais as **dimensões** dos elos do mecanismo para produzir o deslocamento desejado na carga, sendo dado o acionamento?



Plataforma de elevação

Análise:

Qual a **velocidade** do atuador para movimentar adequadamente a plataforma no espaço disponível?

Síntese x Análise



Comando de admissão
em um motor V6 de 3.6 L

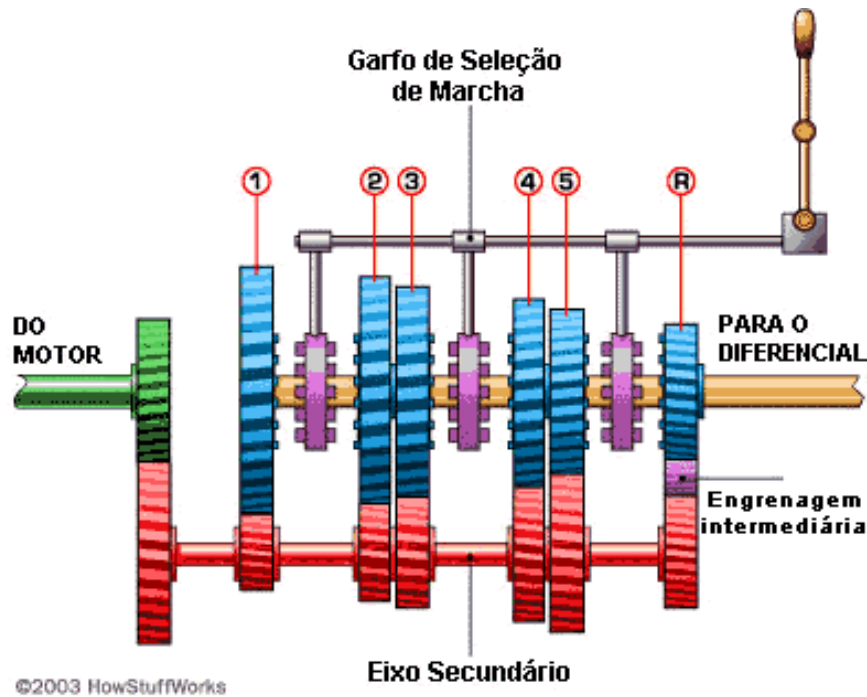
Síntese:

Qual deve ser o perfil (contorno) das came para que as válvulas se abram e se fechem no tempo correto?

Análise:

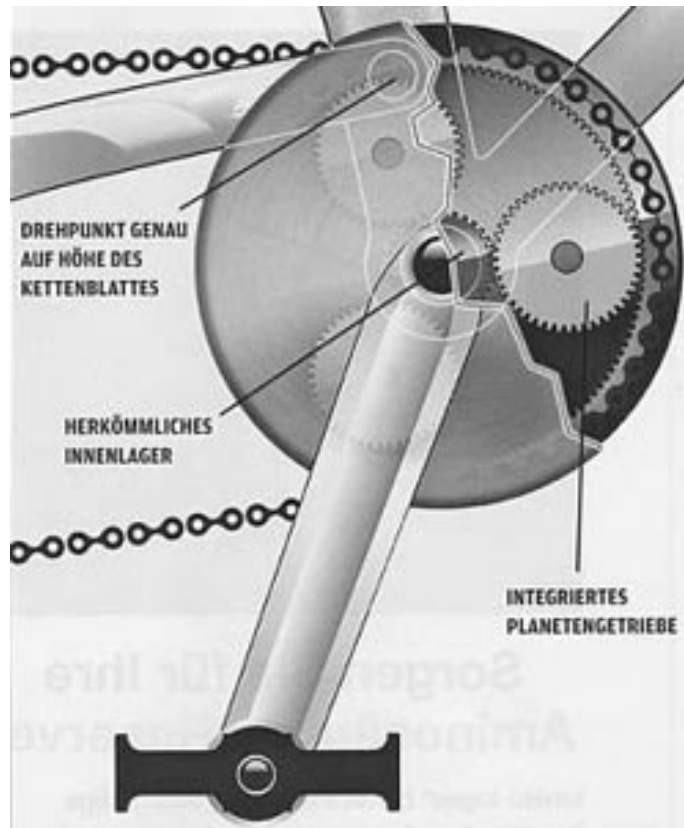
Qual a velocidade de abertura das válvulas em uma determinada rotação do motor?

Síntese x Análise



Síntese:

Qual o número de dentes das engrenagens para produzir as relações desejadas em cada marcha?



Análise:

Quais as velocidades em cada marcha para uma dada velocidade de pedalada?

Avaliações

❑ Avaliação 1

- ❑ Prova escrita (sem consulta)**

- ❑ Mecanismos articulados**

❑ Avaliação 2

- ❑ Prova escrita (sem consulta)**

- ❑ Cames e engrenagens**

❑ Avaliação 3

- ❑ Trabalho prático**

- ❑ Relatório**

- ❑ Maquete**

- ❑ Apresentação**

Plano de Aulas

- Disponível em:

http://ftp.demec.ufpr.br/disciplinas/EngMec_NOTURNO/TMEC025/

- arquivo: **TMEC025-AD-MECANISMOS-2019-2-PLANO DE AULAS.pdf**
 - Distribuição das aulas ao longo do curso
 - Cronograma do Trabalho Prático
 - Bibliografia
 - Composição das notas

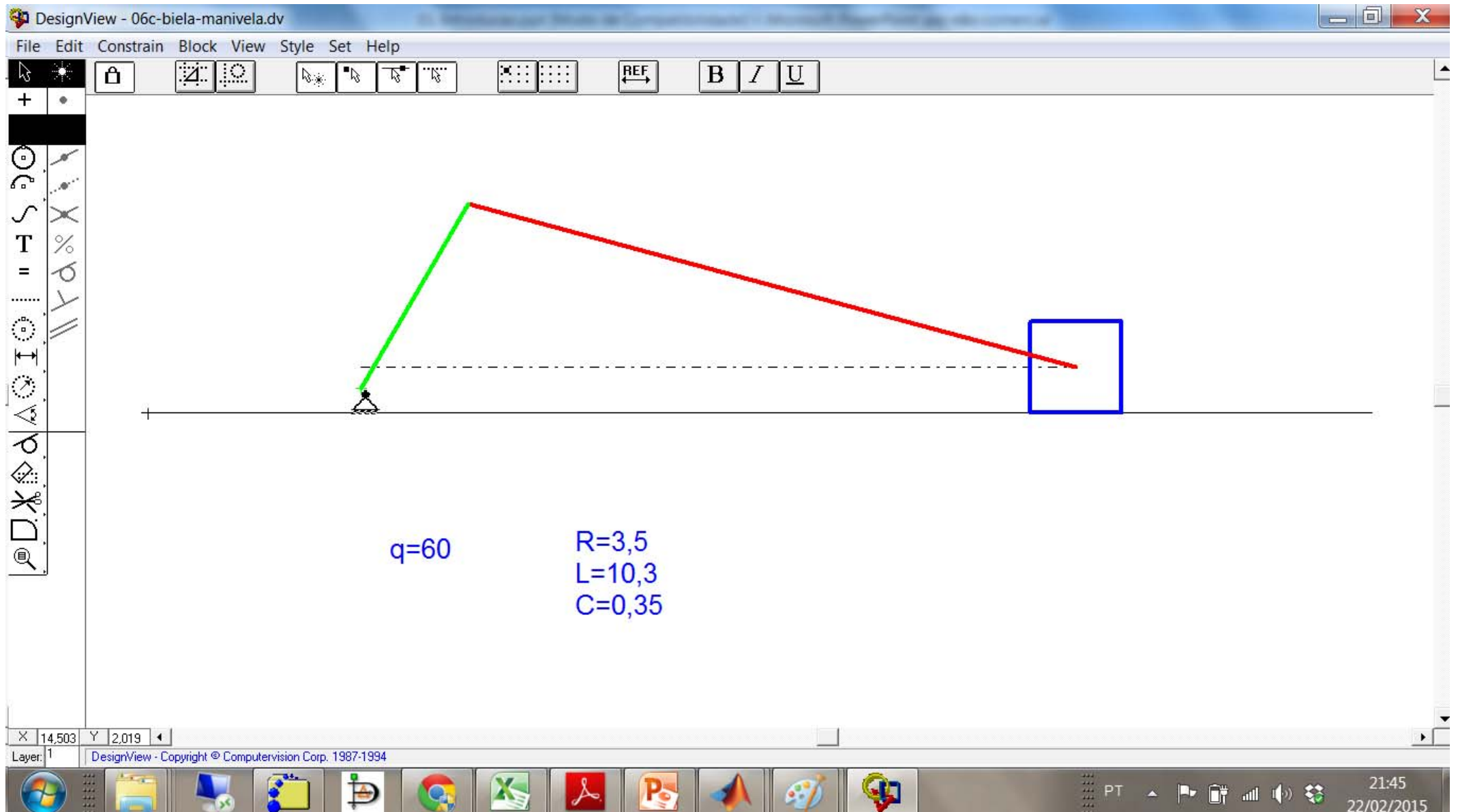
Material de apoio e ferramentas

- Notas de aula
 - slides => <ftp.demec.ufpr.br>
- Bibliografia indicada no Plano de Aula
- Softwares matemáticos
 - MATLAB (www.mathworks.com)
 - Scilab (www.scilab.org/)
 - MathCAD
 - SMath => ftp
 - DesignView => ftp

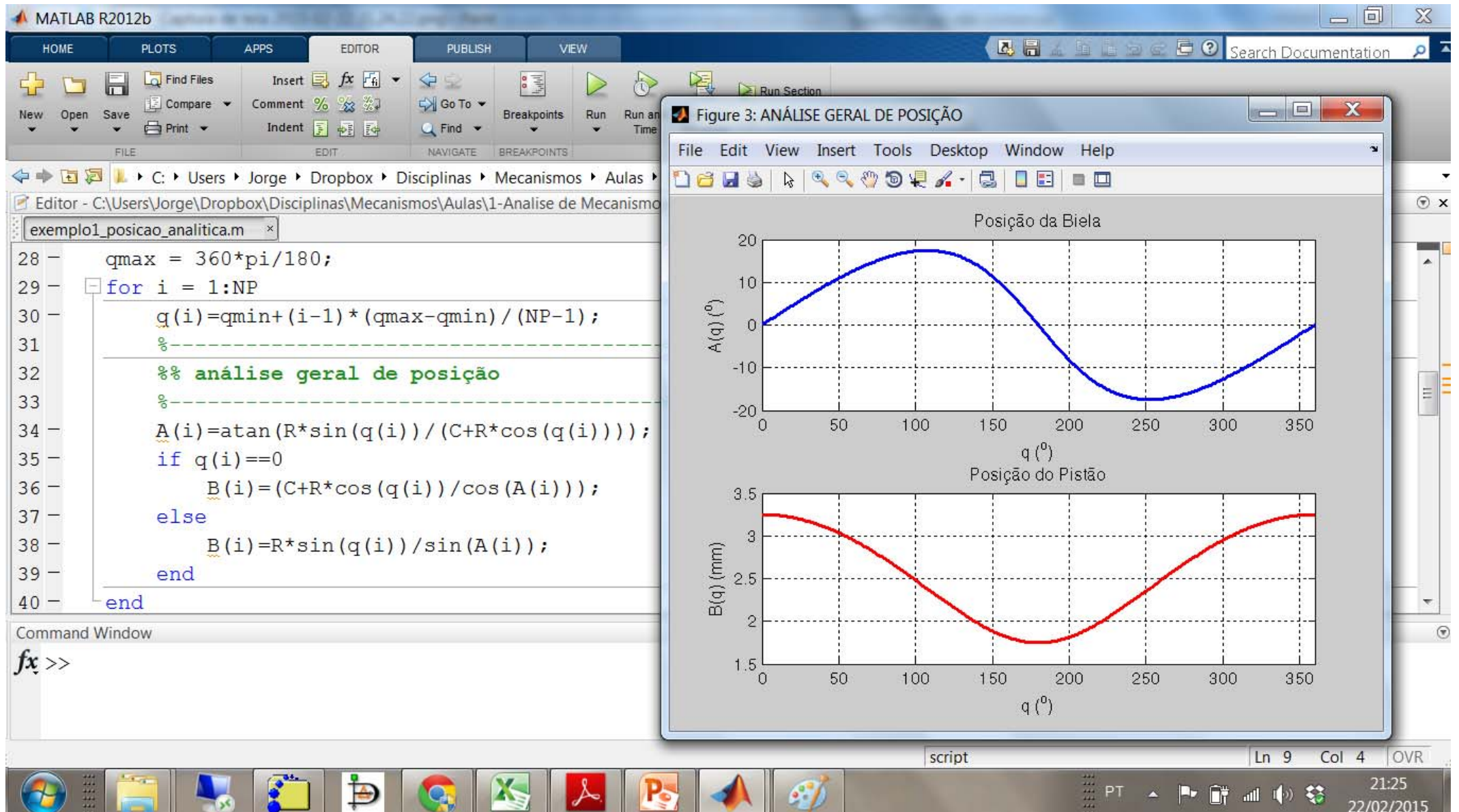
Recomendações

- **FAZER** os exercícios indicados (não serão cobrados)
- Aprender os **SOFTWARES** o mais cedo possível
- Estudar em **GRUPO**
- Sanar **dúvidas IMEDIATAMENTE**
- Não deixar para estudar na **VÉSPERA**

Design View



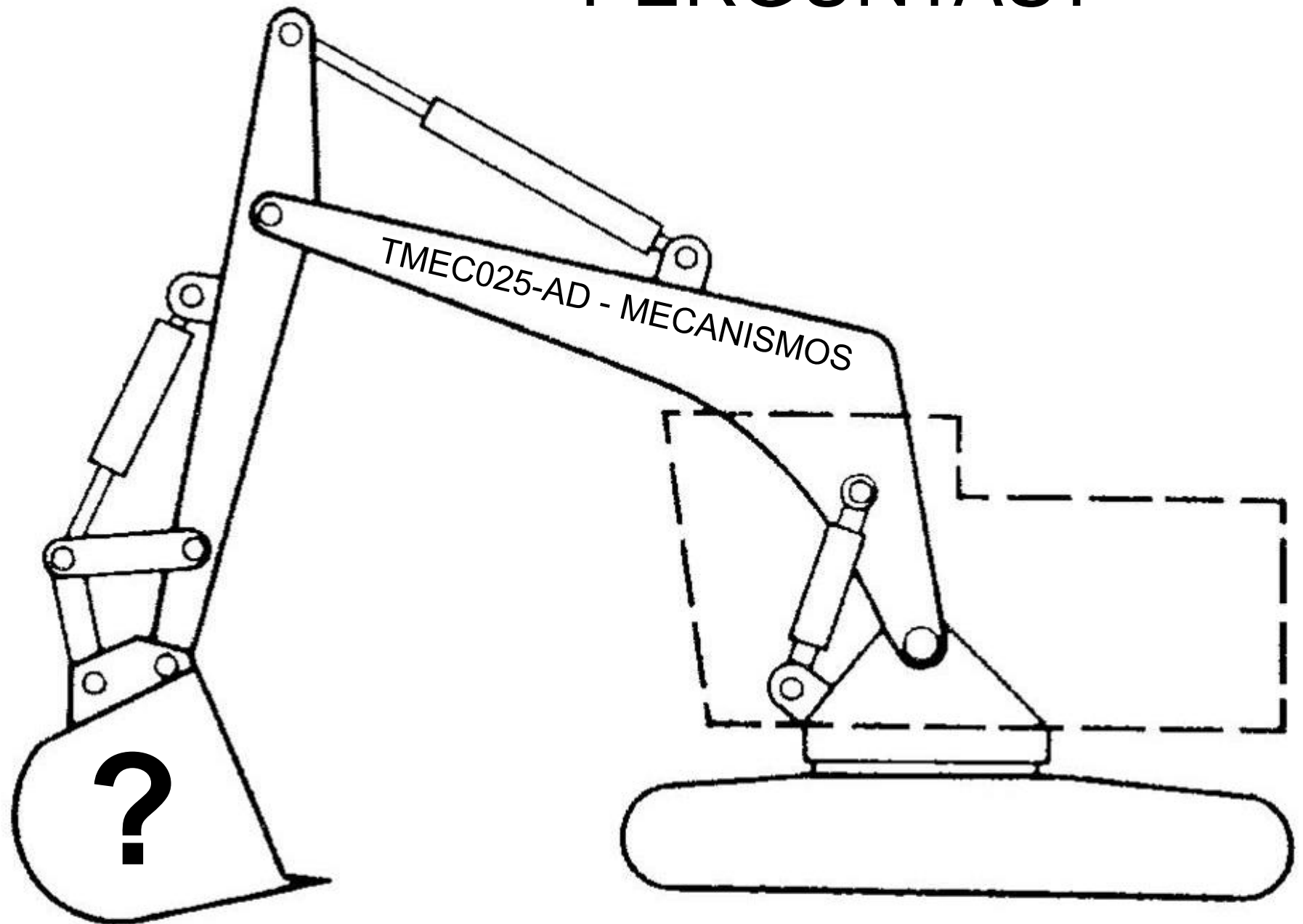
MATLAB



Canais de comunicação

- ftp.demec.ufpr.br
- e-mail: jorgeerthal@gmail.com
 - iniciar o assunto da mensagem por: **TMEC025-AN**
 - ex.: **TMEC025-AN-Dúvida sobre exercício**
- pessoalmente: sala 7-02-A
(ao lado da Coordenação)

PERGUNTAS?



TP1-FORMAÇÃO DAS EQUIPES

Apresentar 4 nomes para compor a equipe de trabalho.

Encaminhar para jorgeerthal@gmail.com

Data limite: 22/08/2019.

Assunto: TMEC025-AN: formação da equipe