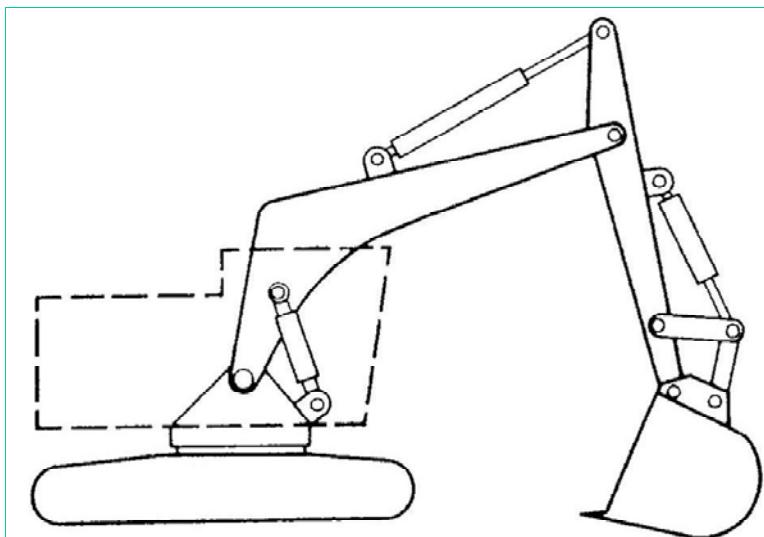


TMEC025 - Mecanismos

1-Introdução

Prof. Jorge Luiz Erthal

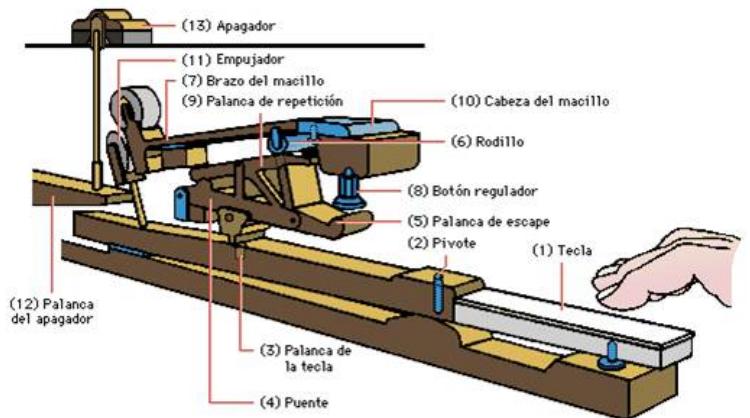
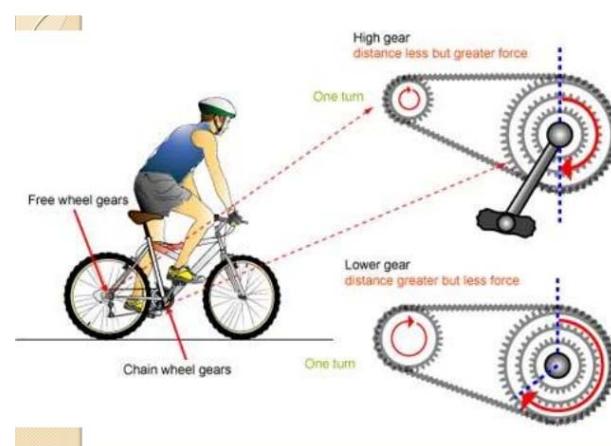
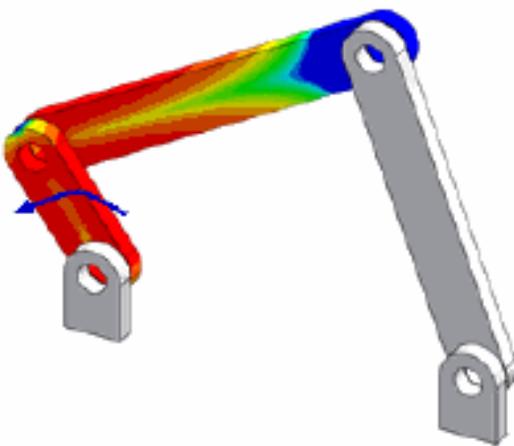
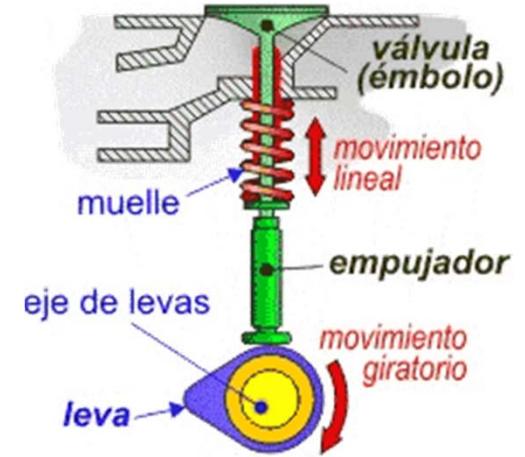
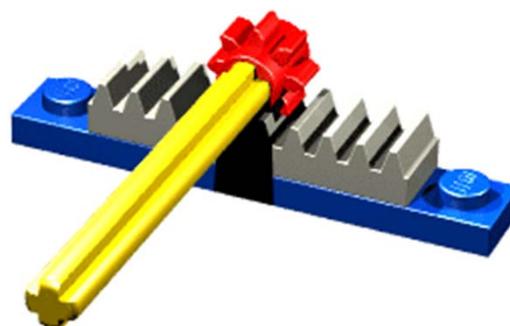
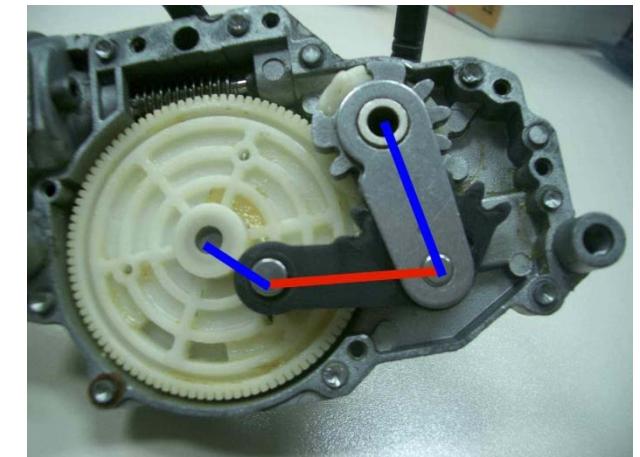
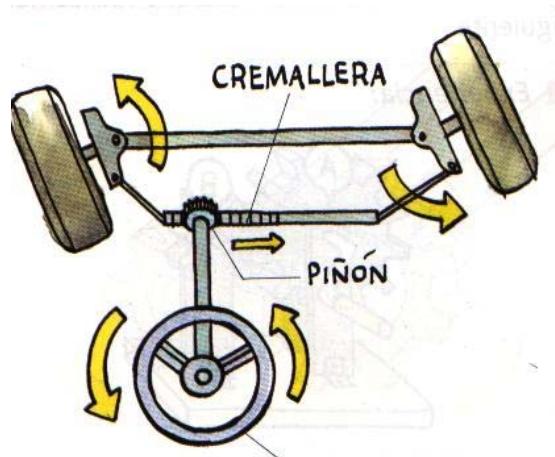
jorgeerthal@gmail.com



Nesta aula

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

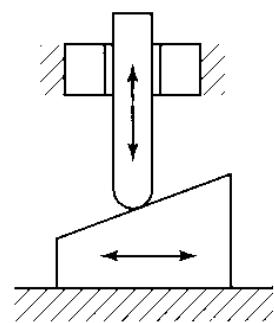
Panorama Geral



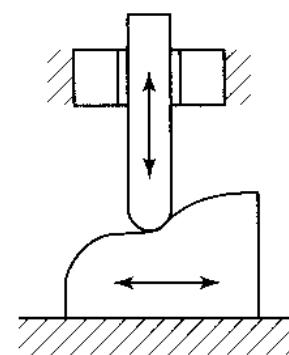
Tipos de movimento em mecanismos

Translação para Translação

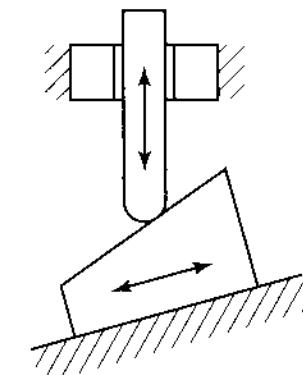
Wedge Cam Follower:
(Perpendicular)



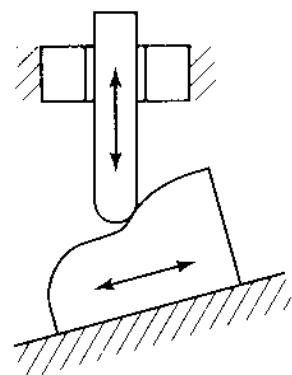
Wedge Cam Follower:
(Perpendicular)



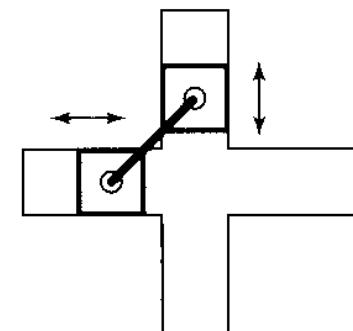
Wedge Cam Follower:
(Skew)



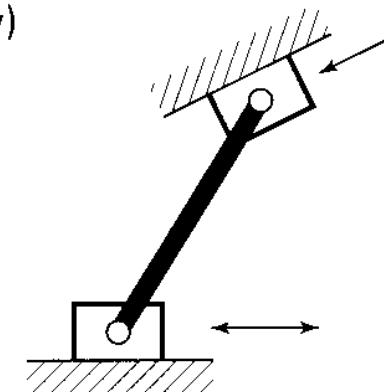
Wedge Cam Follower:
(Skew)



Double-slider:
(Perpendicular)



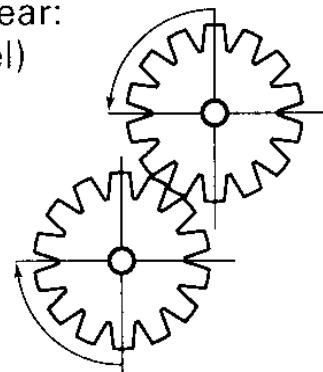
Double-slider:
(Skew)



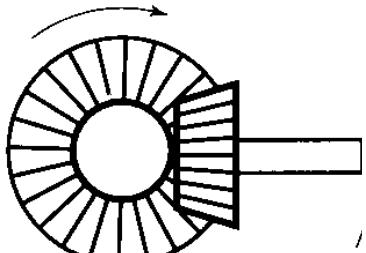
Tipos de movimento em mecanismos

Rotação para Rotação

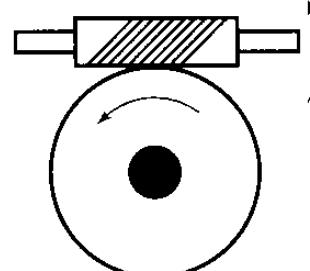
Spur Gear:
(Parallel)



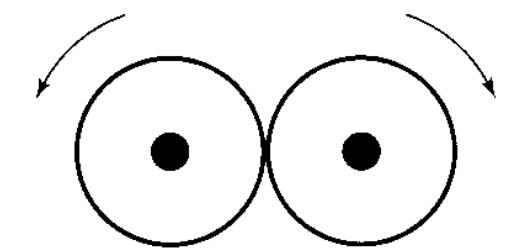
Bevel Gear:
(Perpendicular)



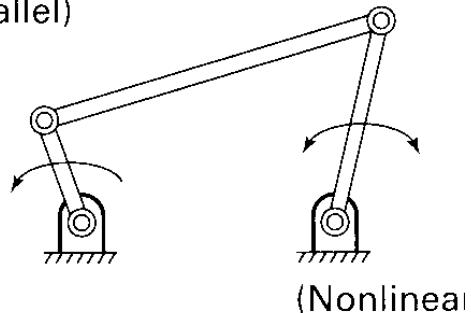
Worm Gear:
(Perpendicular)



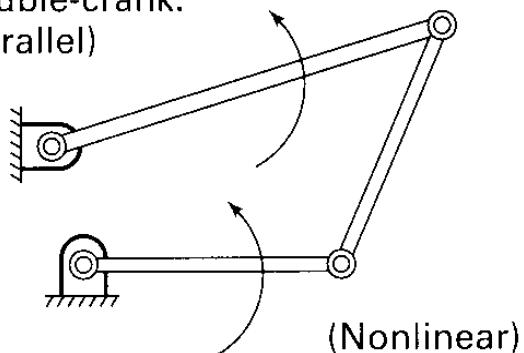
Friction Rollers Pair:
(Parallel)



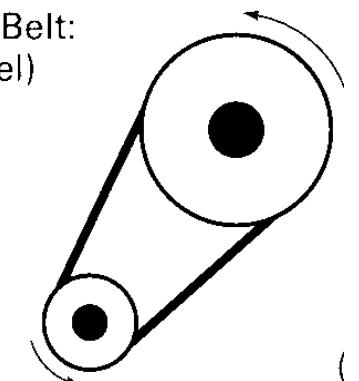
Crank-rocker:
(Parallel)



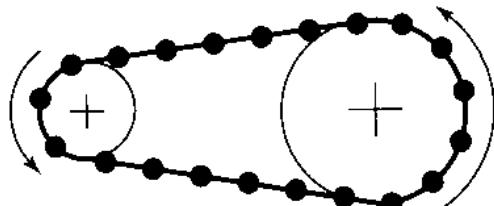
Double-crank:
(Parallel)



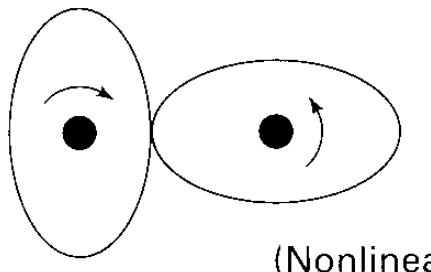
Pulley Belt:
(Parallel)



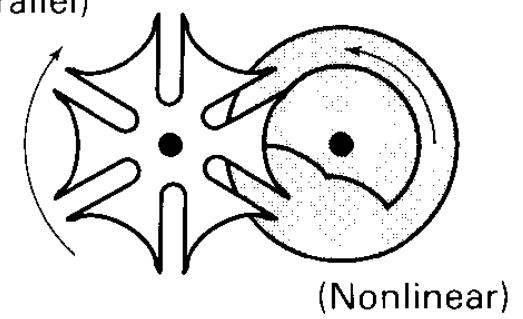
Sprocket and Chain:
(Parallel)



Noncircular Gear:
(Parallel)



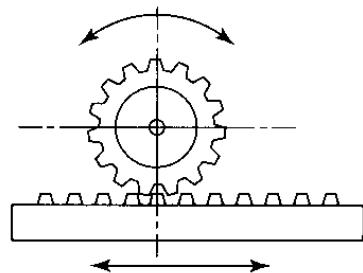
Geneva Wheel:
(Parallel)



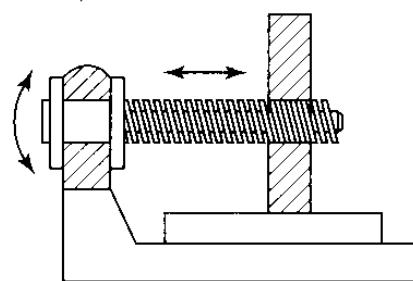
Tipos de movimento em mecanismos

Rotação para translação

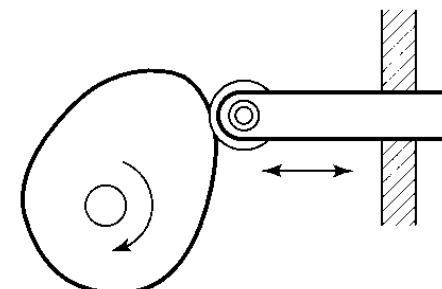
Rack-pinion:
(Perpendicular)



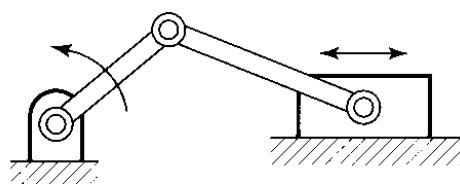
Screw Mechanism:
(Parallel)



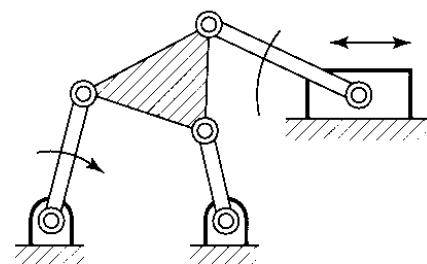
Cam Follower:
(Perpendicular)



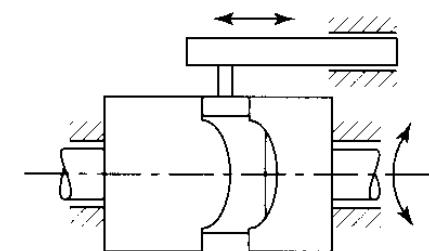
Slider-crank:
(Perpendicular)



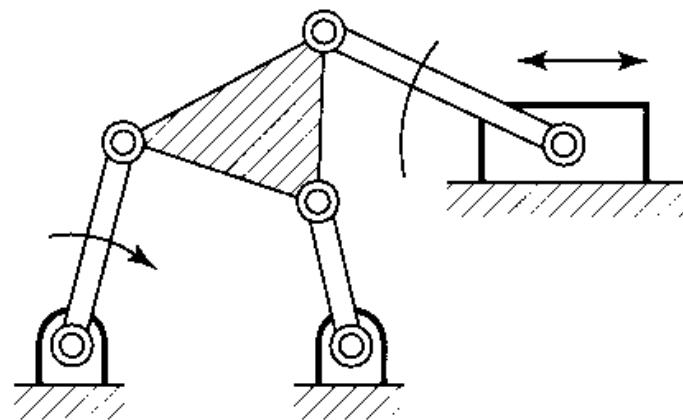
Six-bar Dwell Linkage:
(Perpendicular)



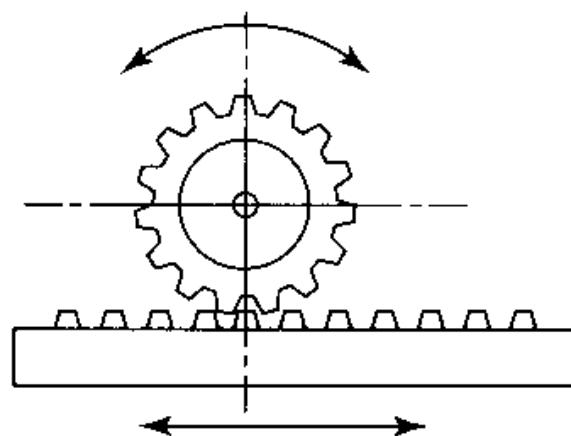
Cylindrical Cam Follower:
(Parallel)



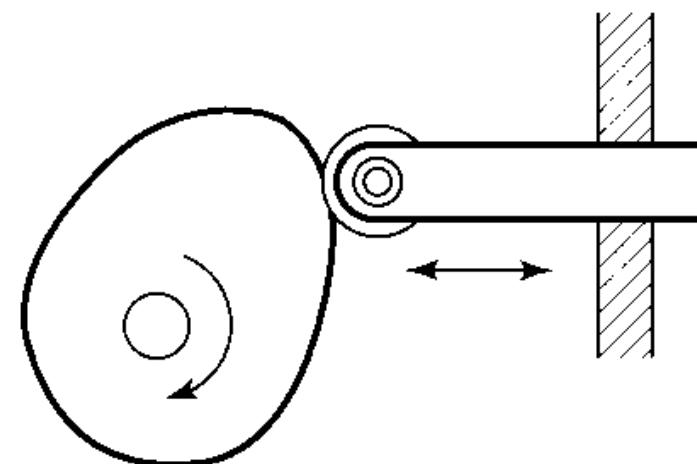
EXEMPLOS DE MECANISMOS



ARTICULADOS

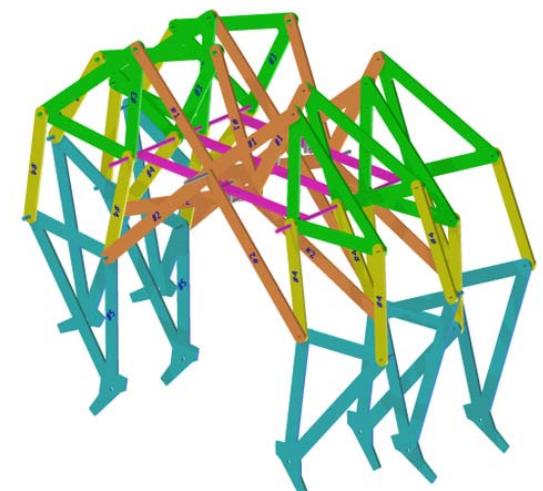


ENGRENAGENS



CAMES

Mecanismos Articulados

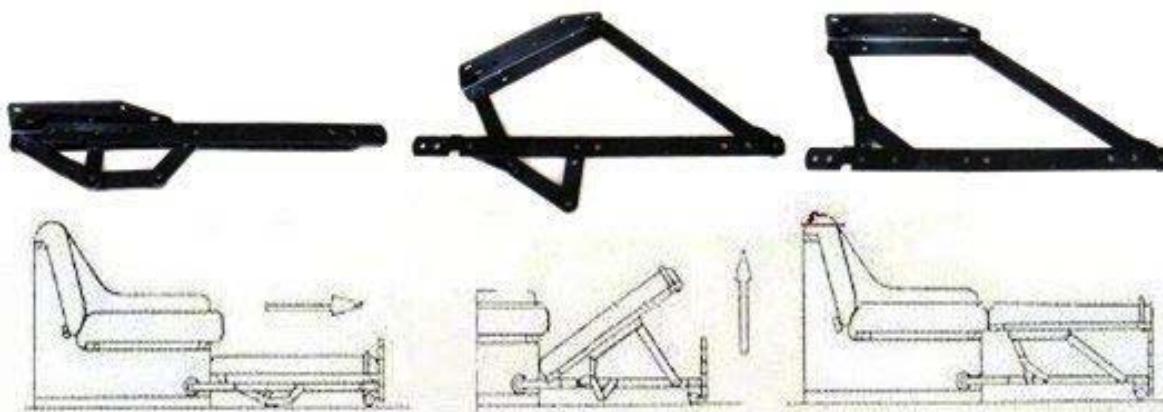


[Tribute to Theo Jansen's kinetic sculptures](#)



[Beach Animals, The Strandbeest](#)

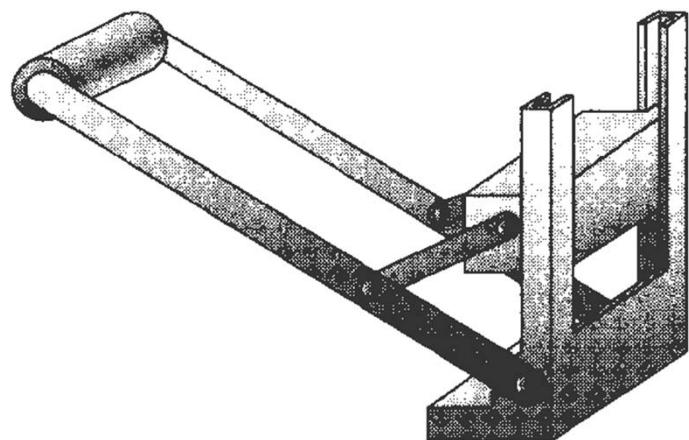
Mecanismos Articulados



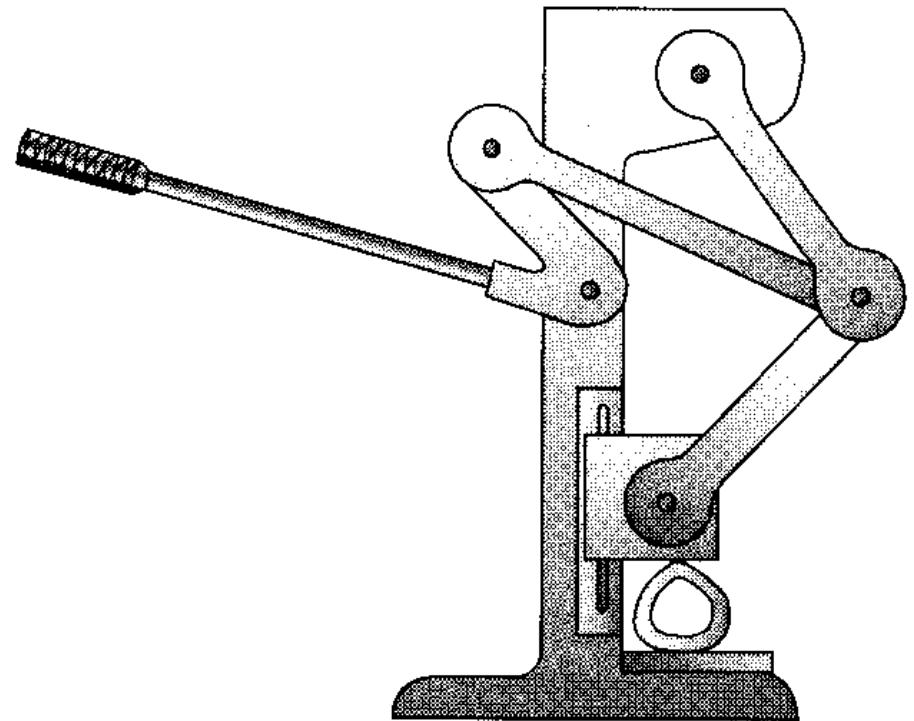
Móveis



Mecanismos articulados



Amassador de latas



Prensa

Mecanismos articulados

Industria Automotiva



Mecanismos articulados

Freno de mano

trinquete

uñeta

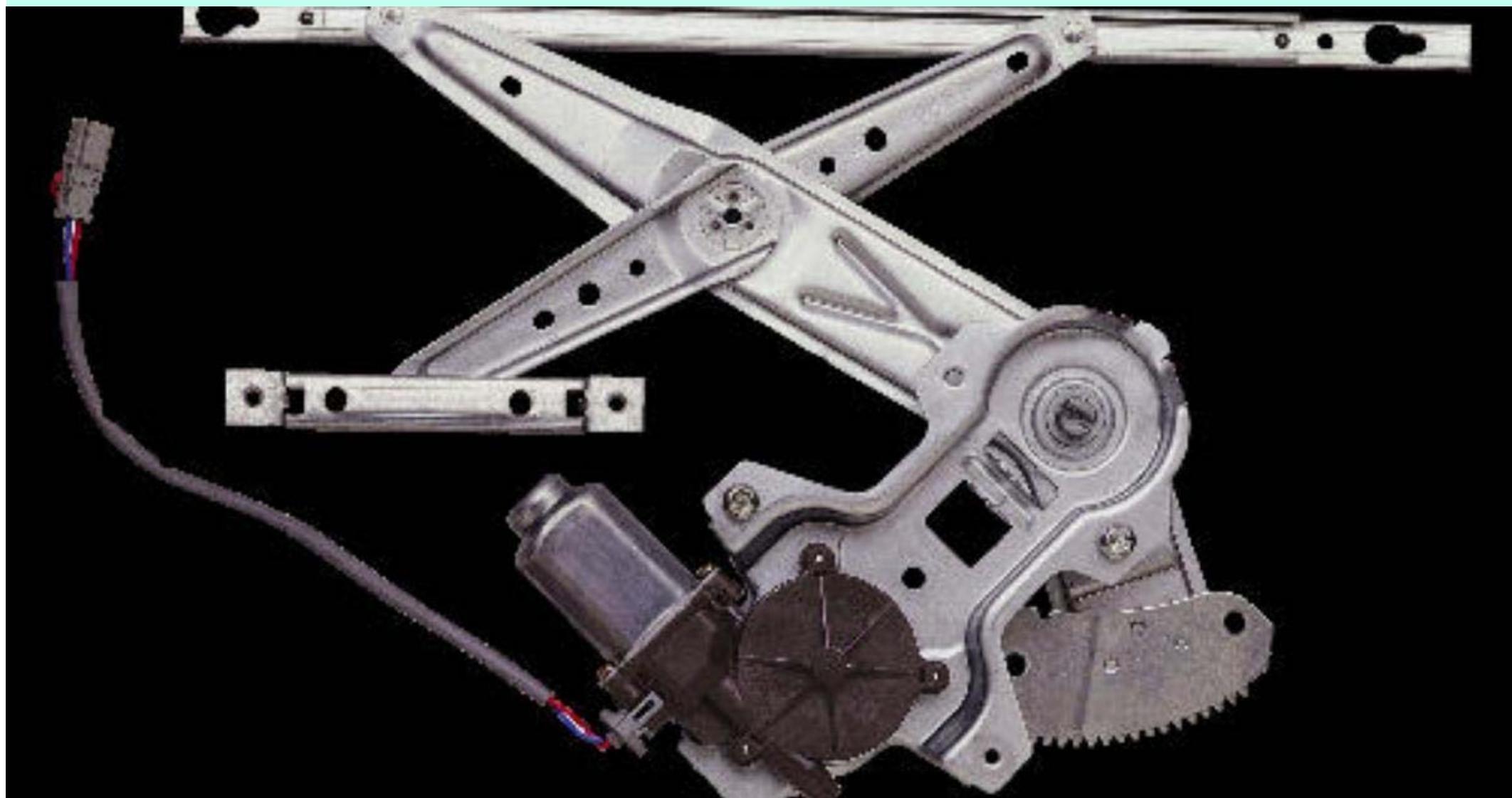
botón de liberación

cable de freno

muelle

Freio de estacionamento

Mecanismos articulados



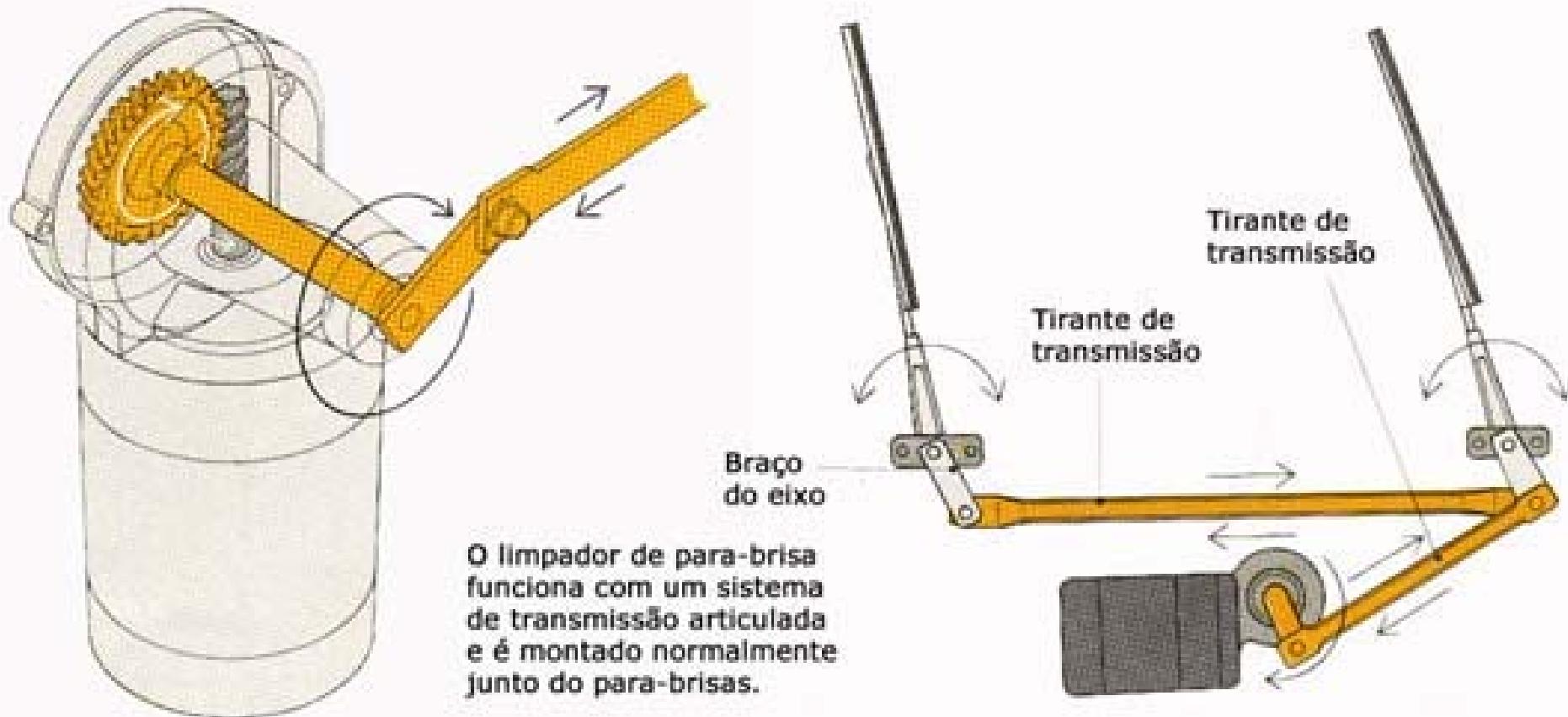
Acionamento do vidro

Mecanismos articulados



Capota conversível

Mecanismos articulados



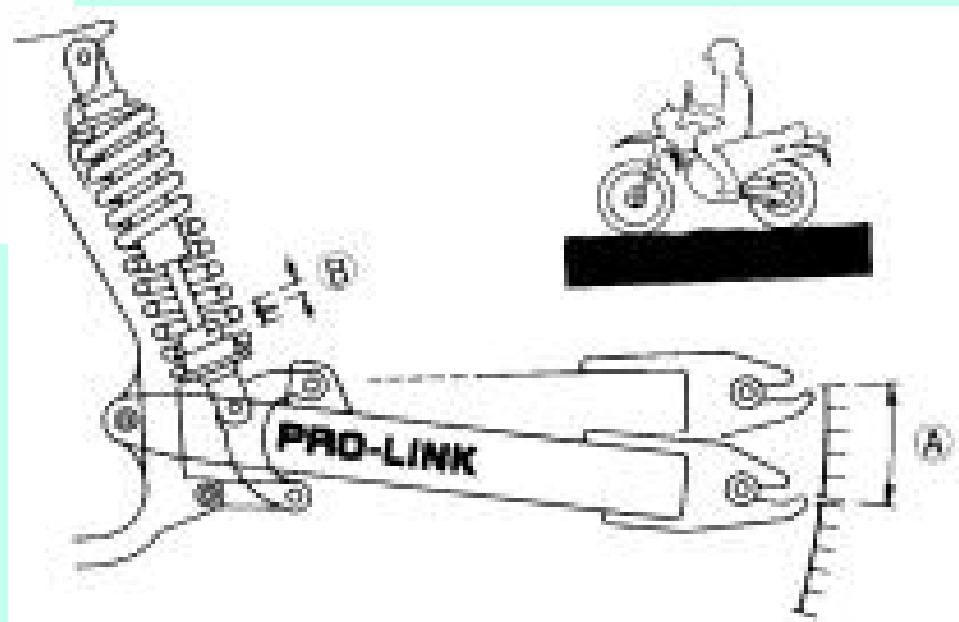
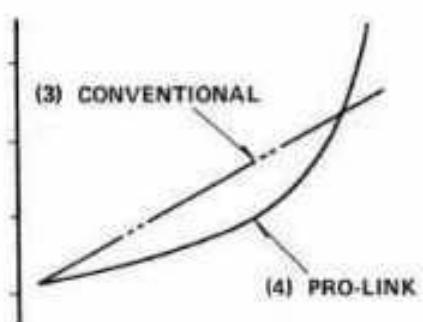
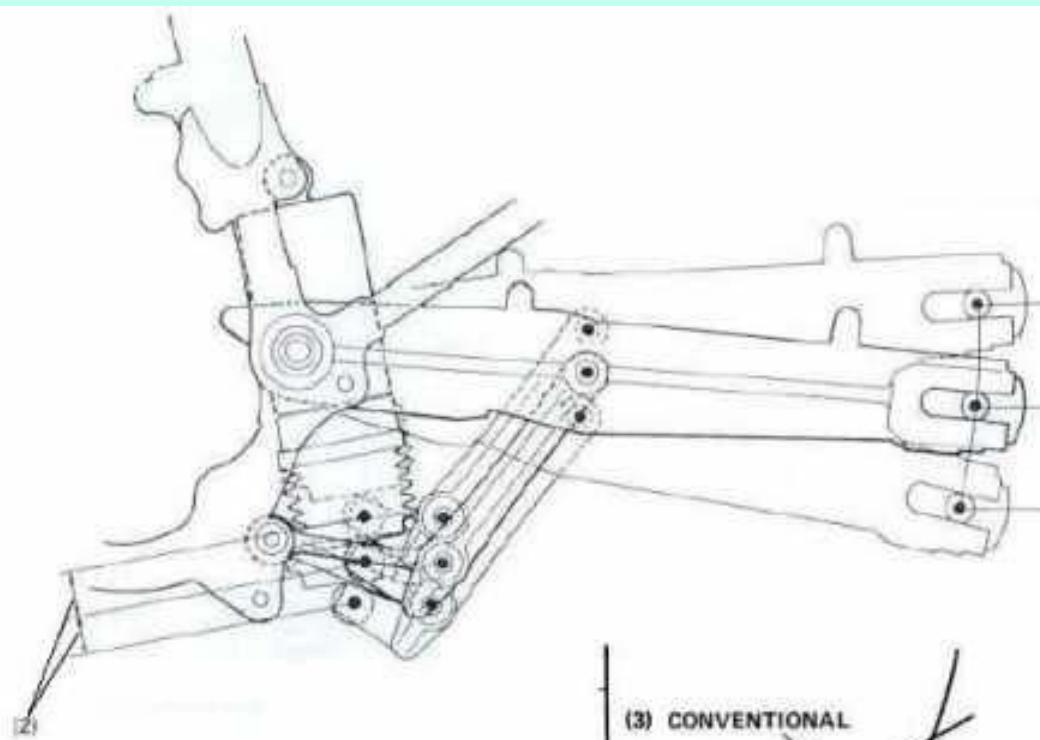
Limpador do para-brisa

Mecanismos articulados



Suspensão

Mecanismos articulados

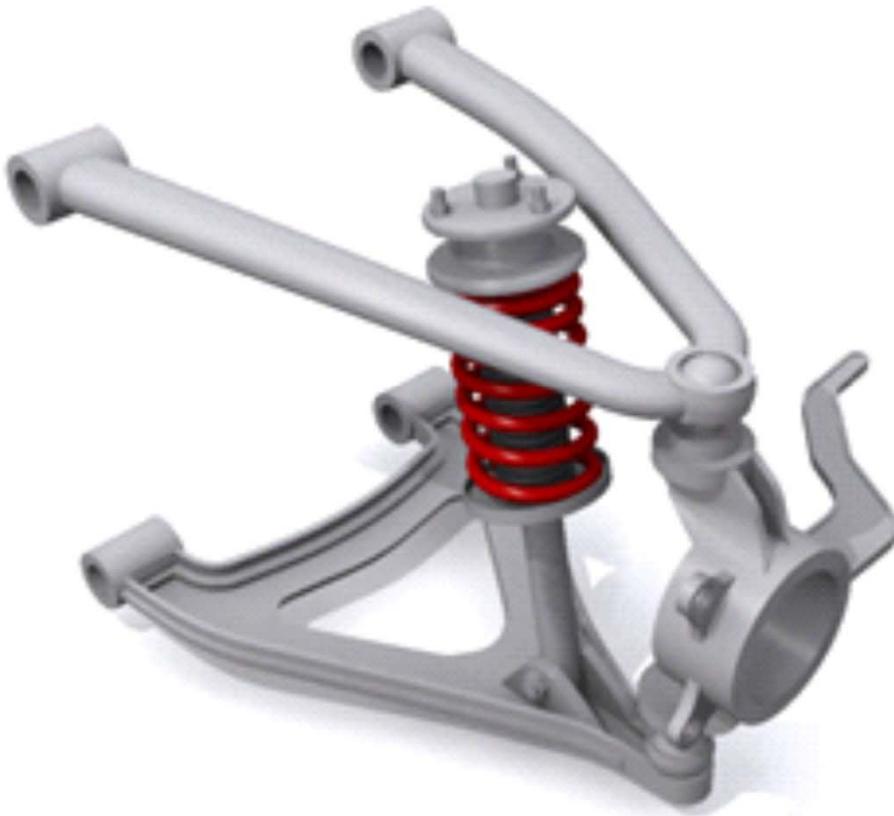


Suspensão

Mecanismos articulados



Suspensão McPherson



Suspensão Duplo A

Mecanismos articulados



Suspensão McPherson
(dianteira)



Suspensão de Braços
Arrastados (traseira)

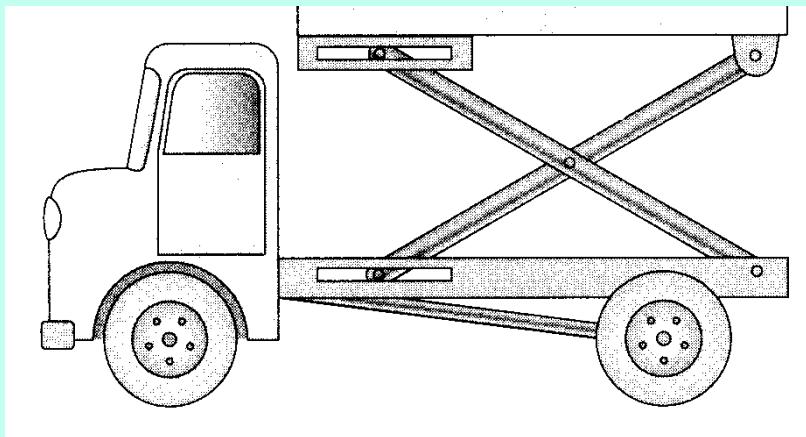


Mecanismos articulados

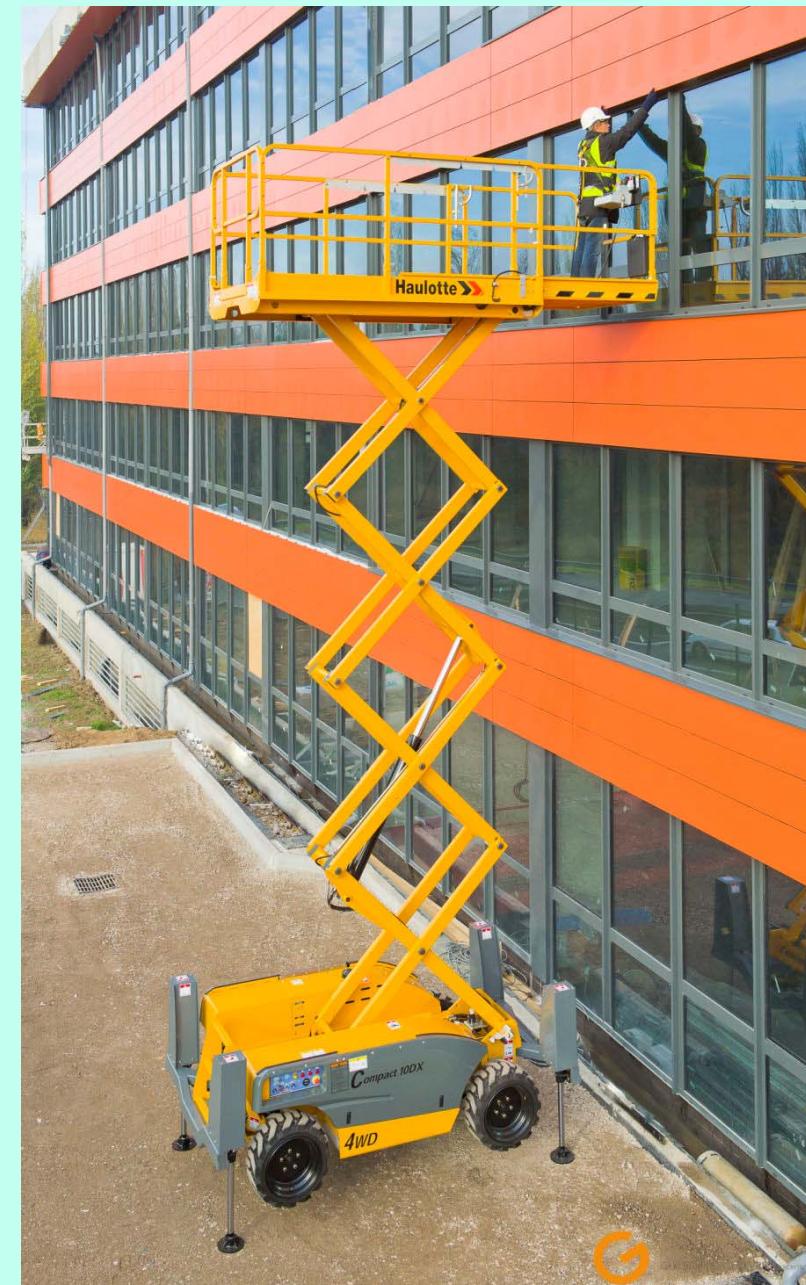
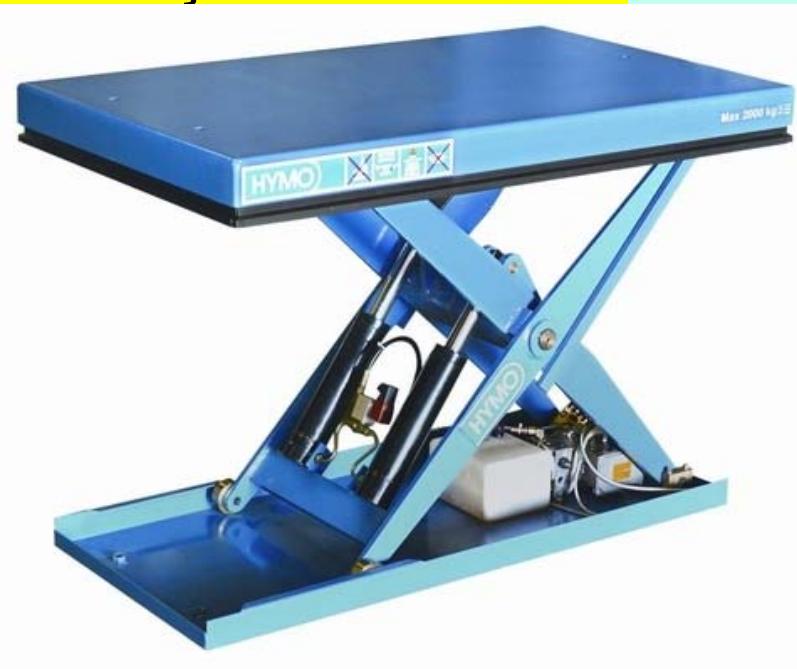


Suspensão / direção

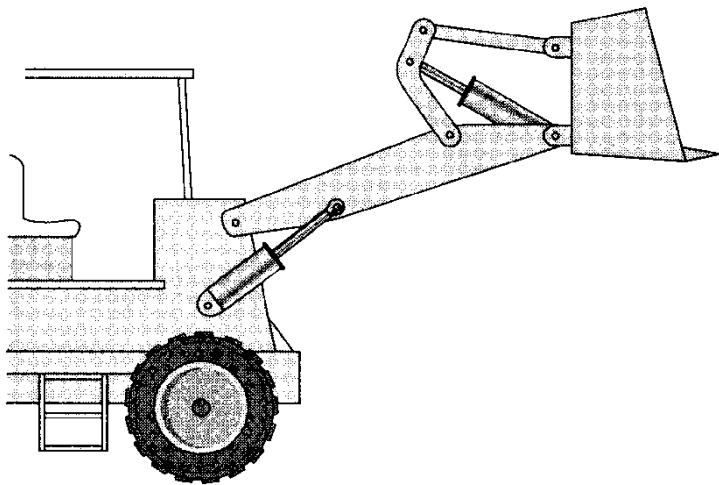
Mecanismos articulados



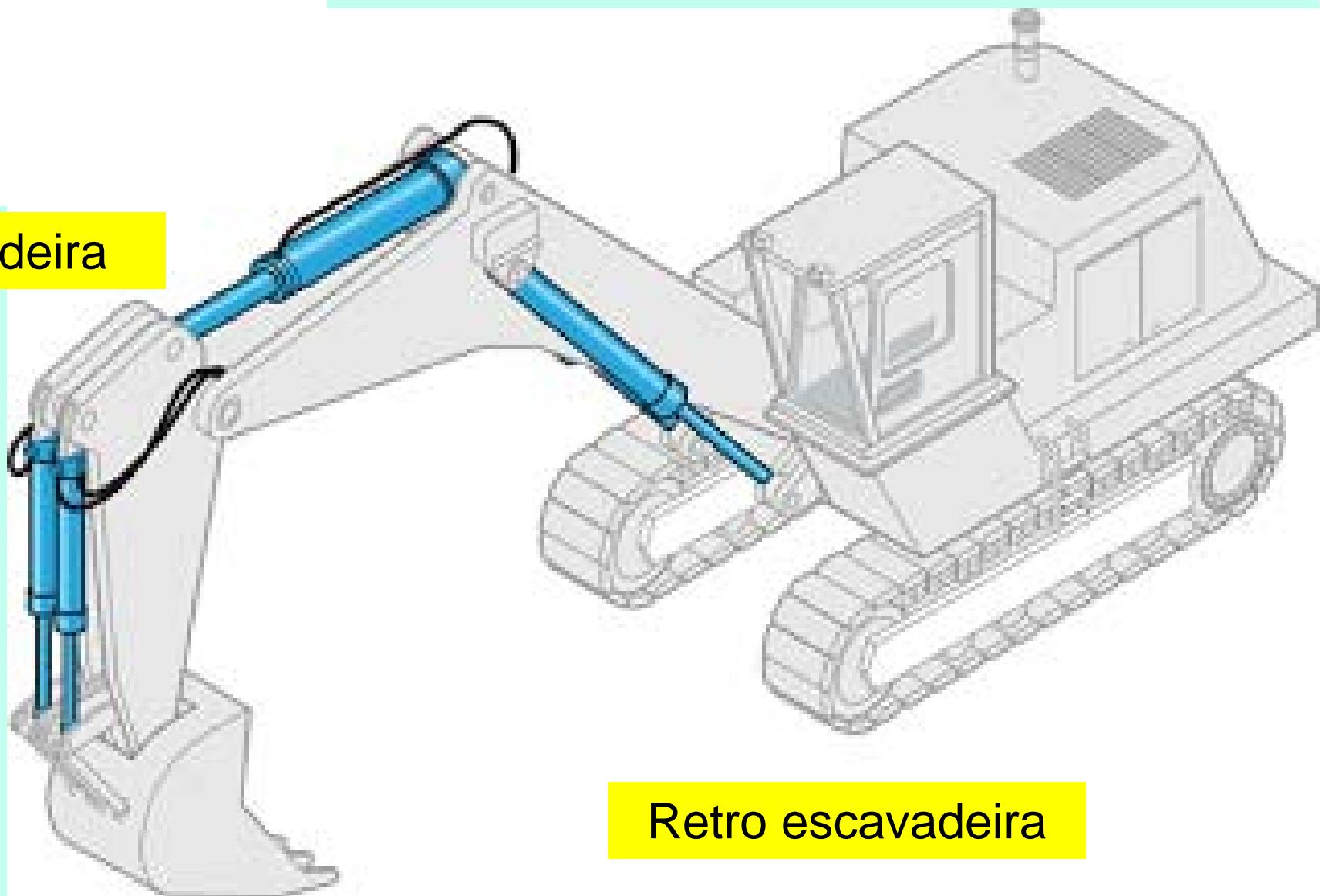
Plataformas de elevação



Mecanismos articulados

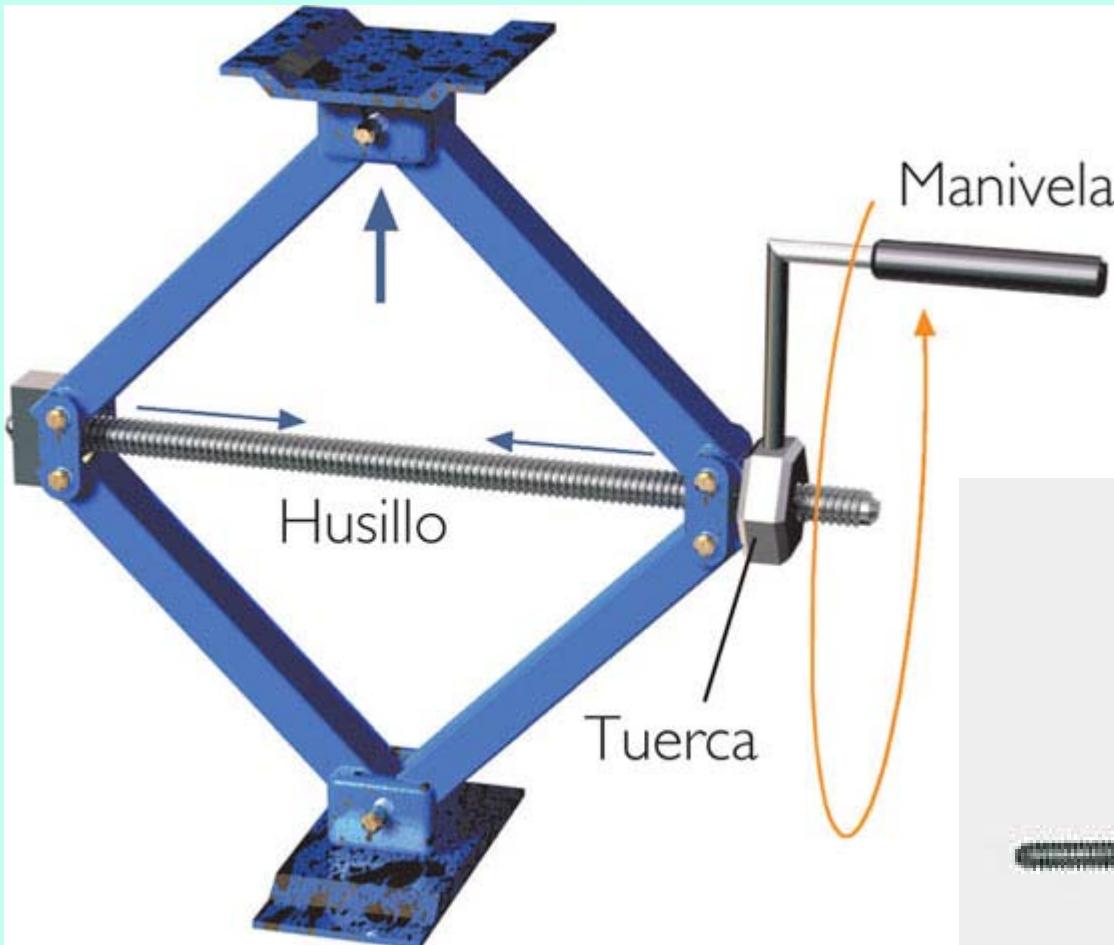


Pá Carregadeira



Retro escavadeira

Mecanismos articulados



Macaco



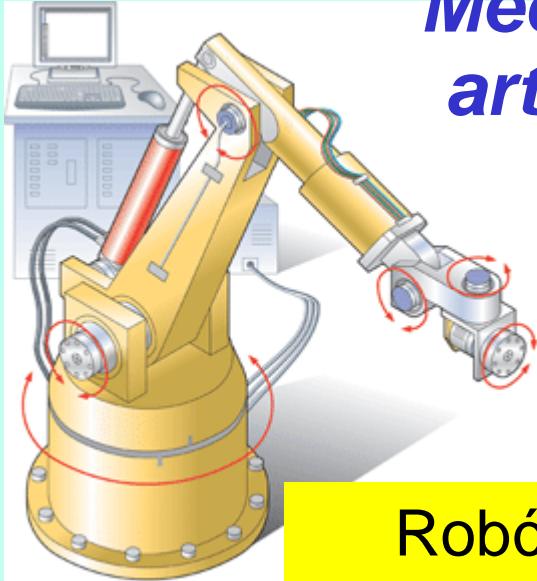
Mecanismos articulados



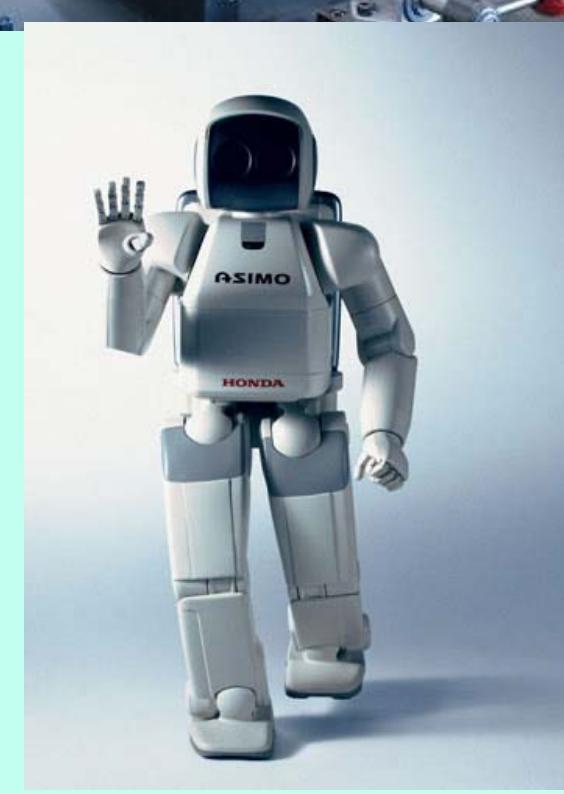
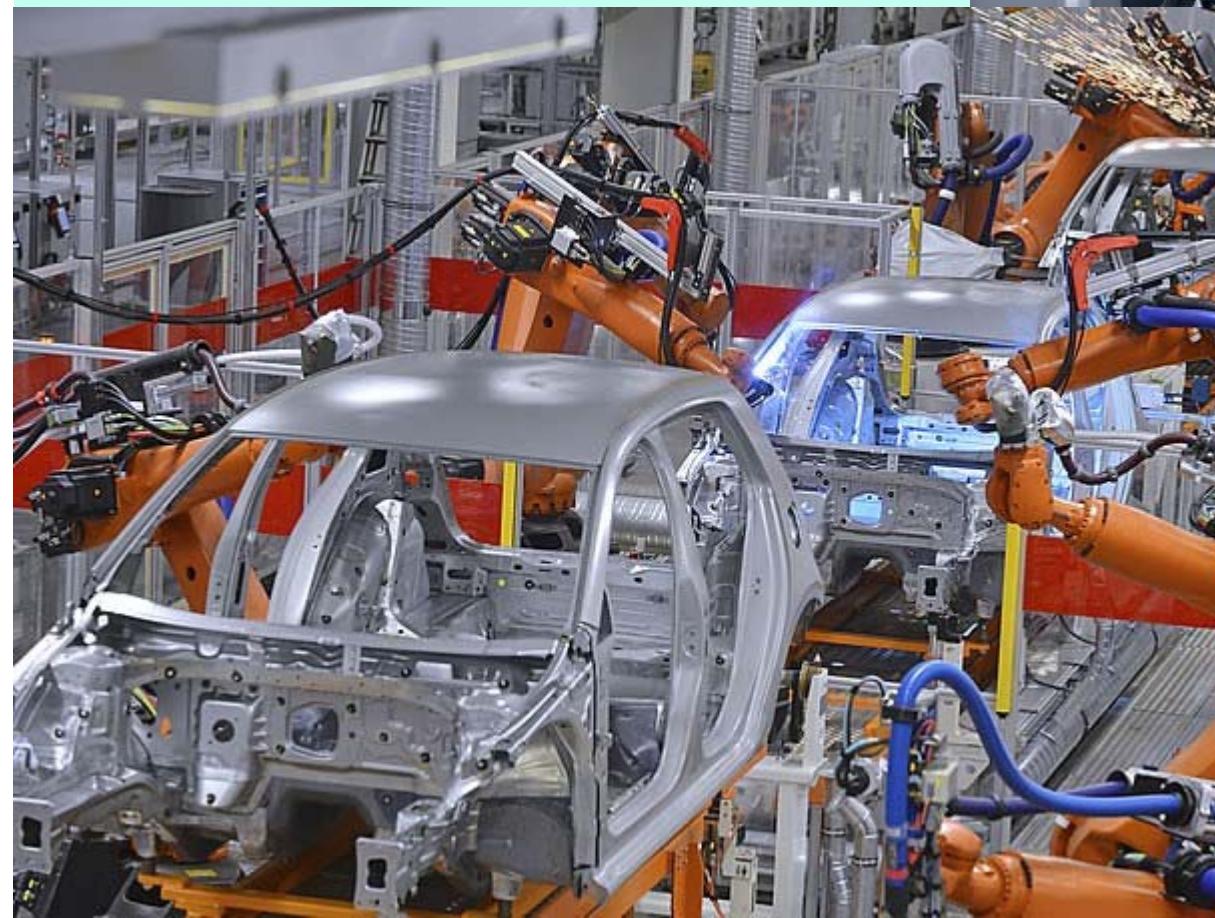
Equipamentos de ginástica



Mecanismos articulados



Robótica



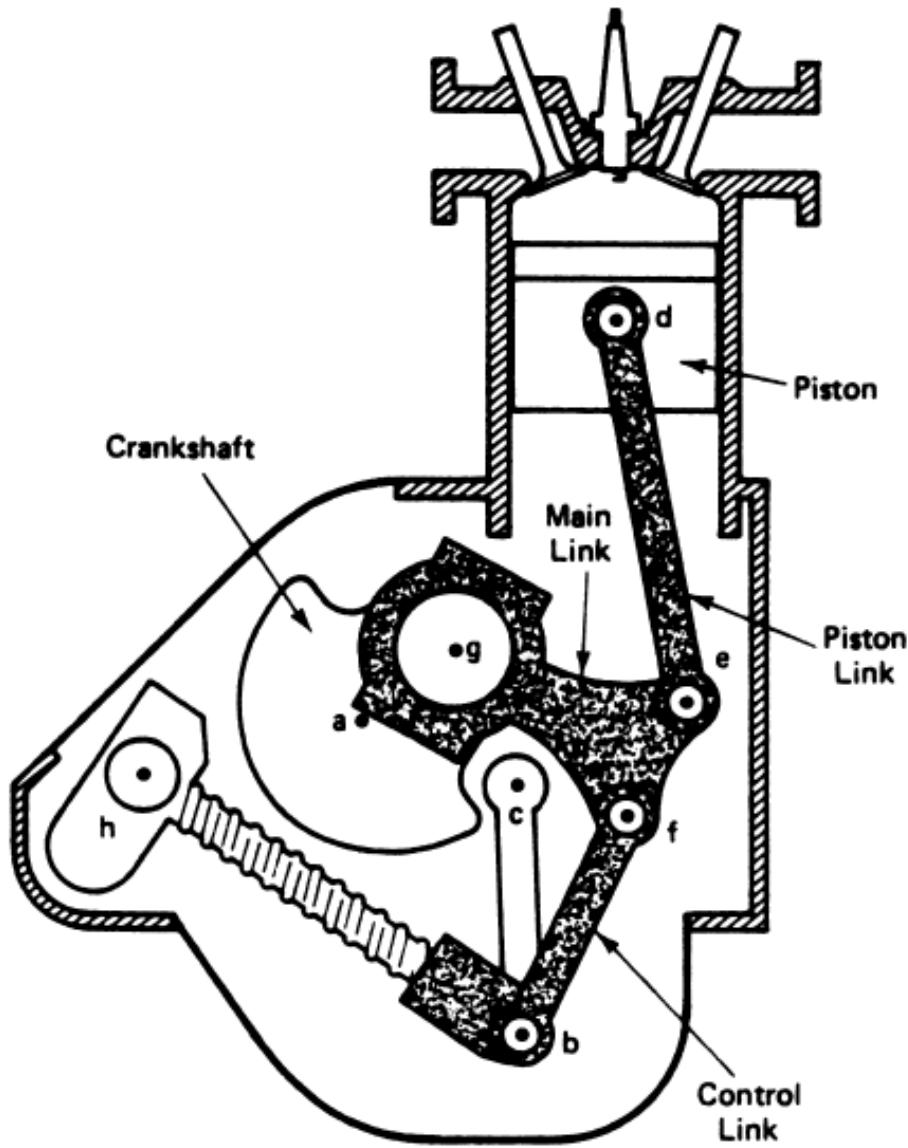
Mecanismos articulados



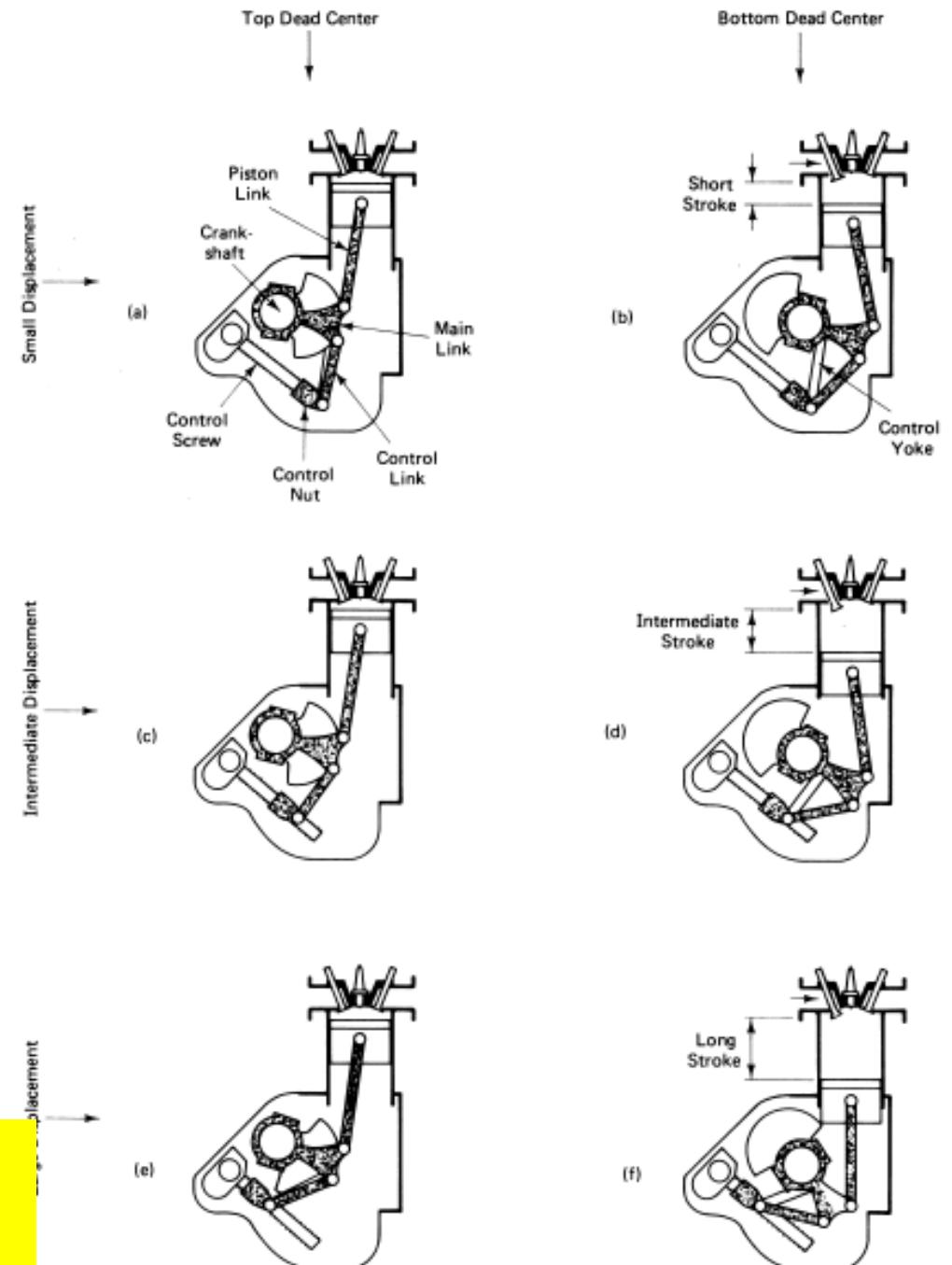
Biomecânica



Mecanismos articulados

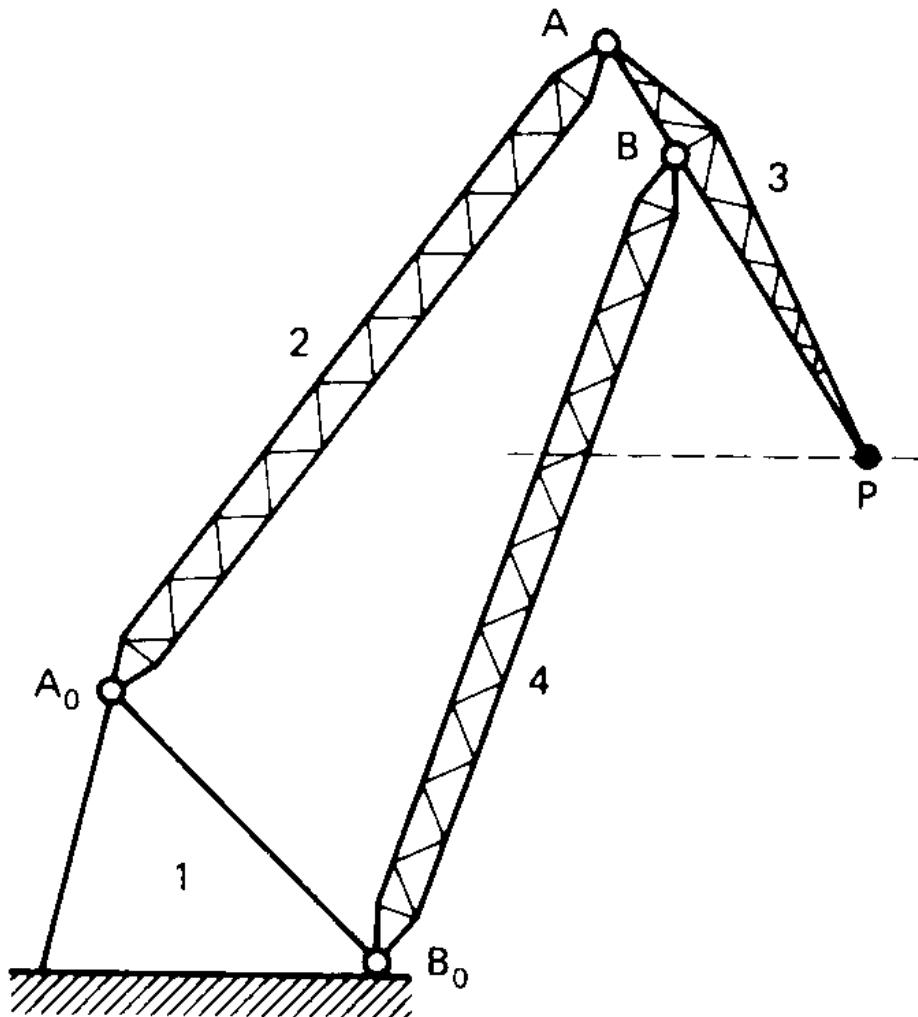


Motor de taxa de compressão variável



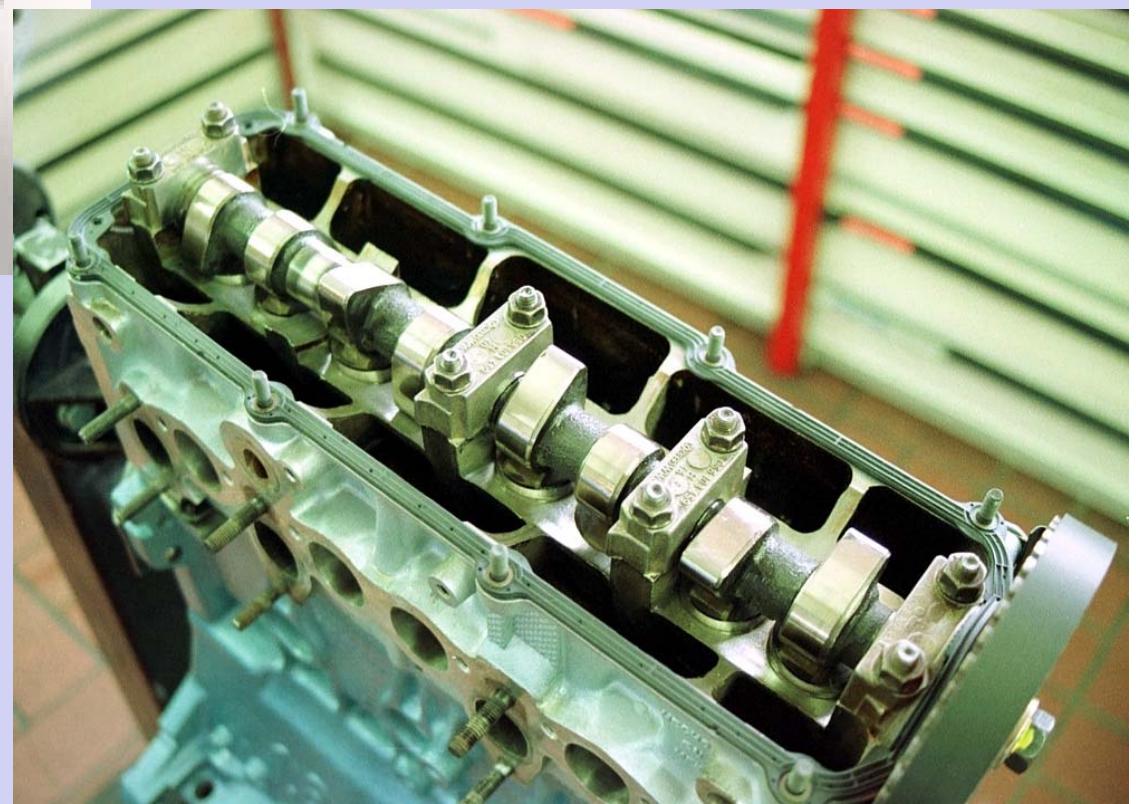
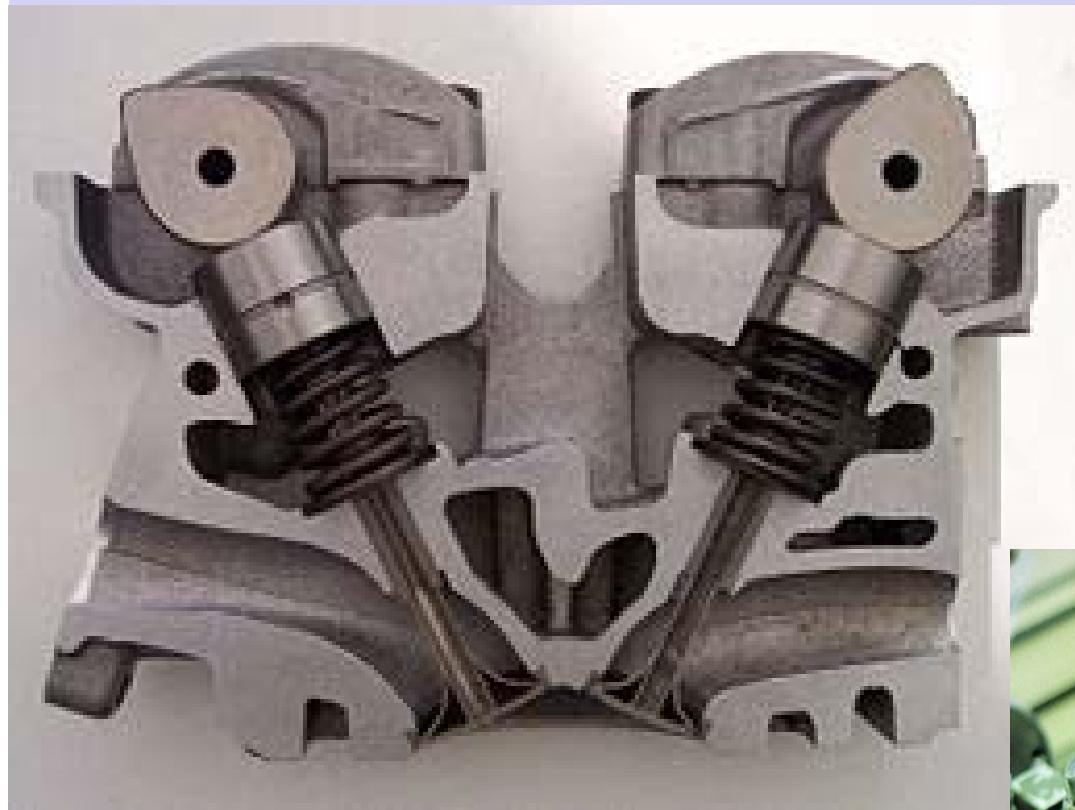
Mecanismos articulados

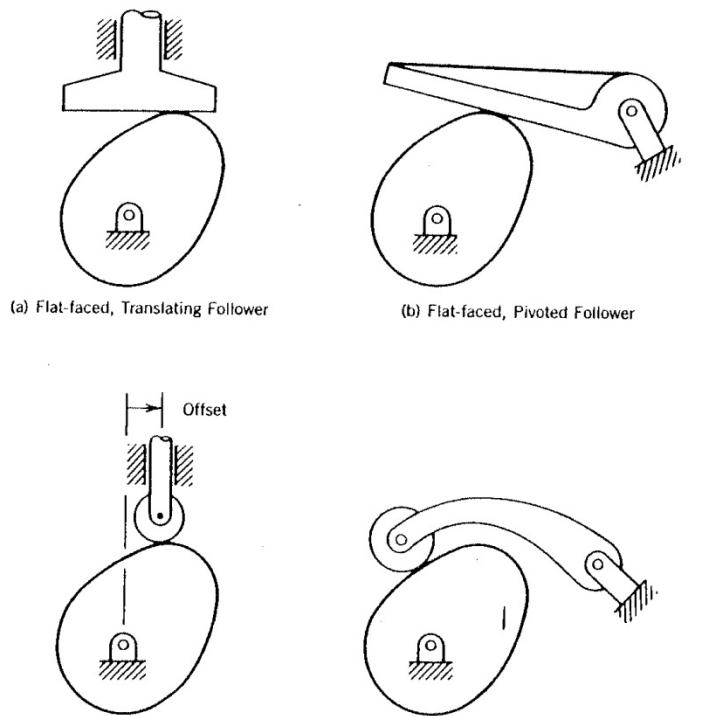
Interessa o percurso de um ponto isolado (**ponto de interesse**).



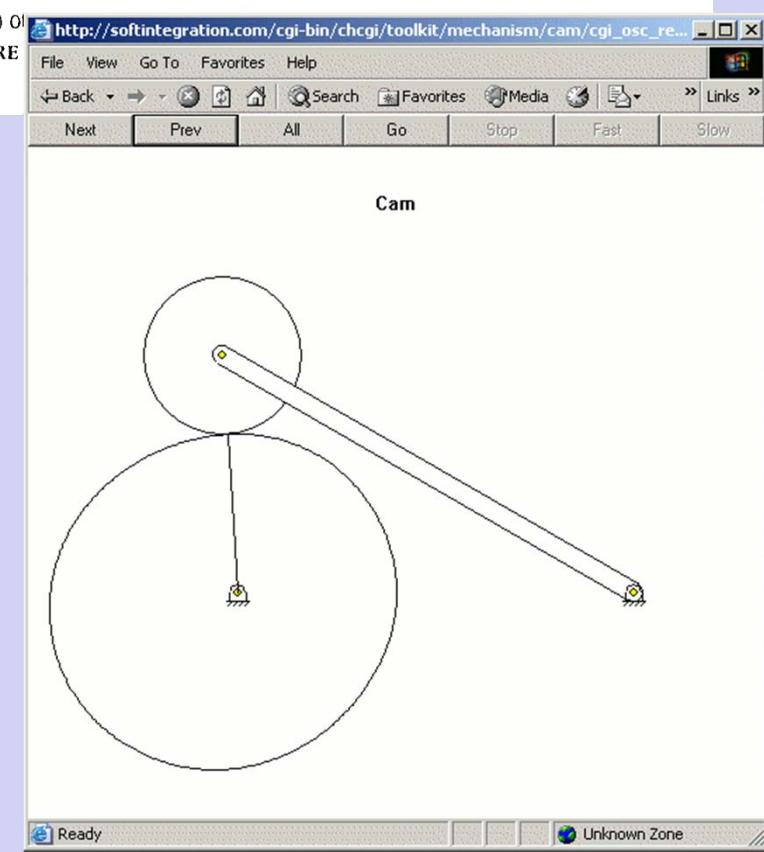
Guindaste – movimento em linha reta.

Cames

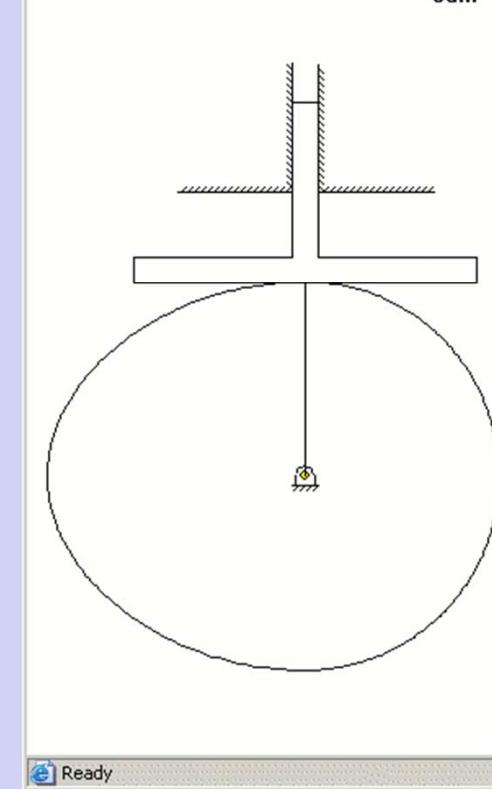
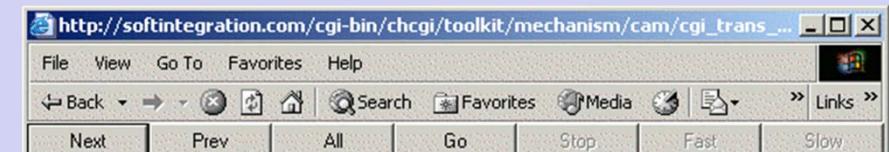




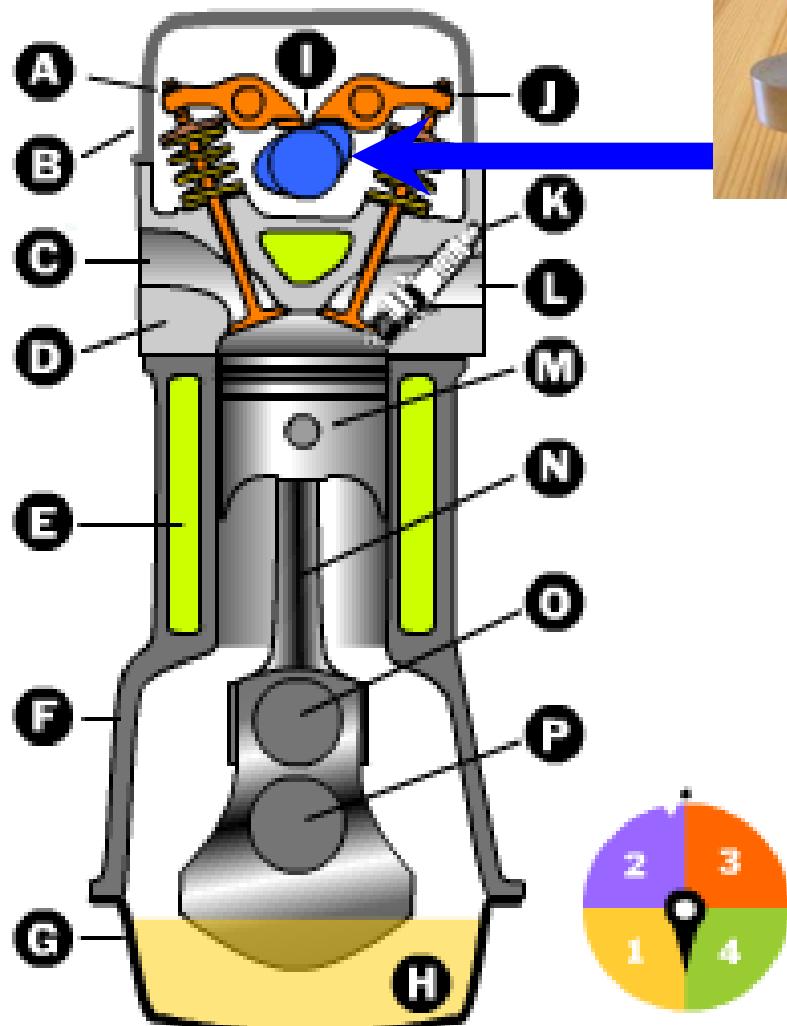
FIGURE



Cames



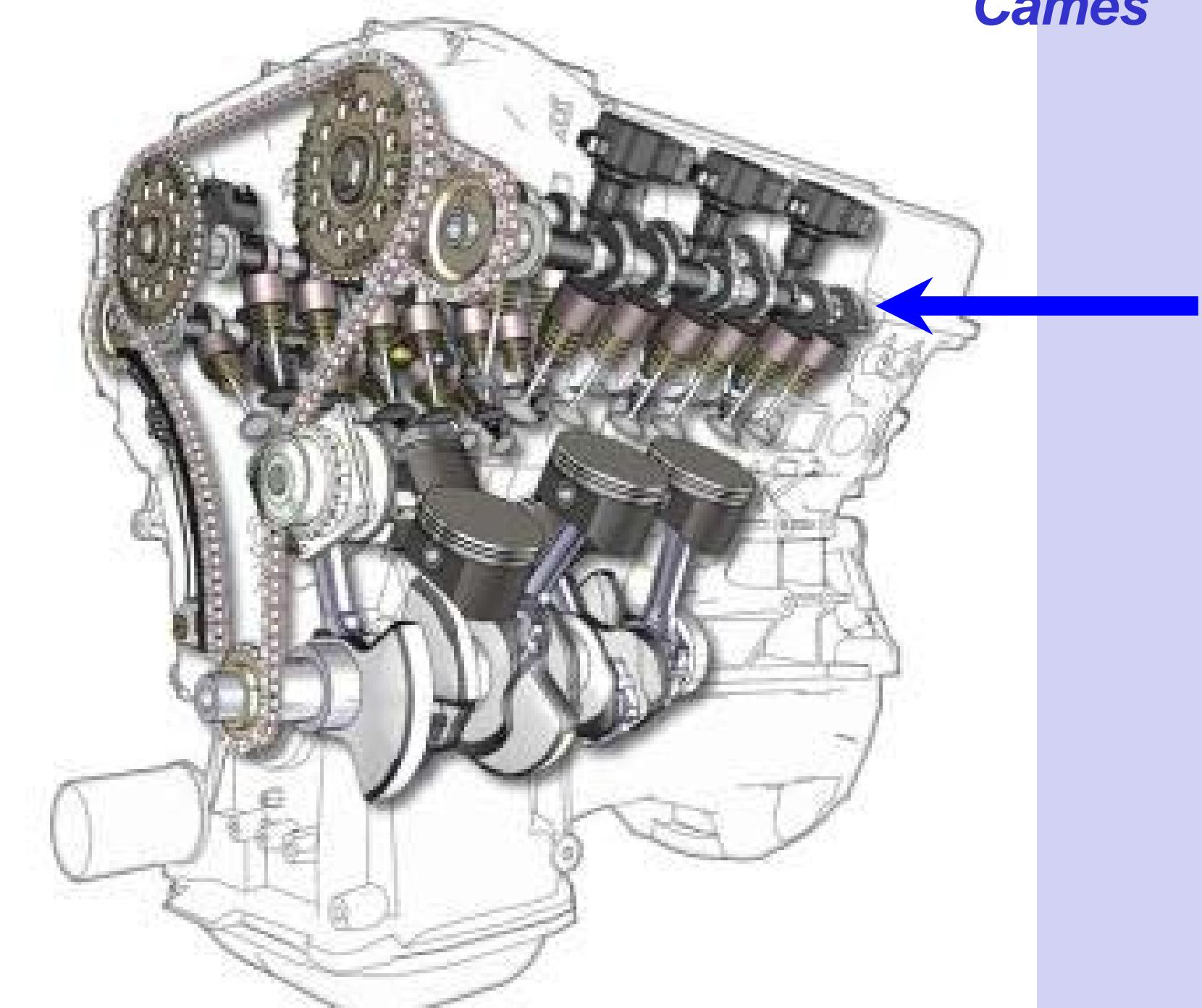
Cames



- | | |
|---|------------------------|
| A: Válvula de Admissão, Balancim e Mola | I: Comando de válvulas |
| J: Válvula de escape, Balancim e Mola | B: Tampa de Válvulas |
| C: Duto de Admissão | G: Vela de ignição |
| D: Cabeçote | L: Duto de escape |
| E: Agua | M: Pistão |
| F: Bloco do Motor | N: Biela |
| G: Carter | O: Mancal da Biela |
| H: Óleo | P: Virabrequim |
-
- | |
|----------------------|
| 1: ADMISSÃO |
| 2: COMPRESSÃO |
| 3: EXPLOSÃO |
| 4: EXAUSTÃO |
| Centelha |
| Ponto Morto Superior |

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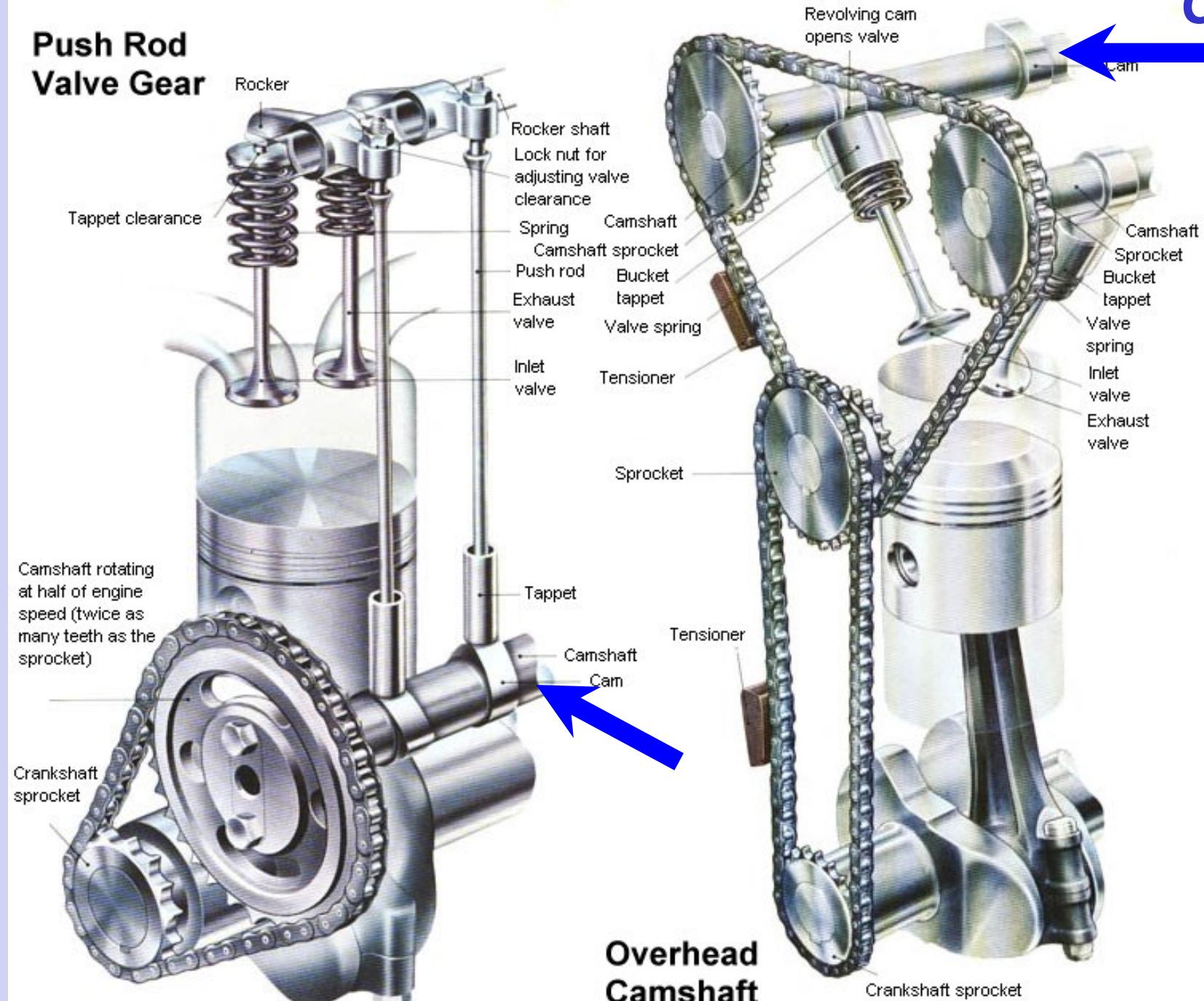
Cames



Motores de combustão interna

Cames

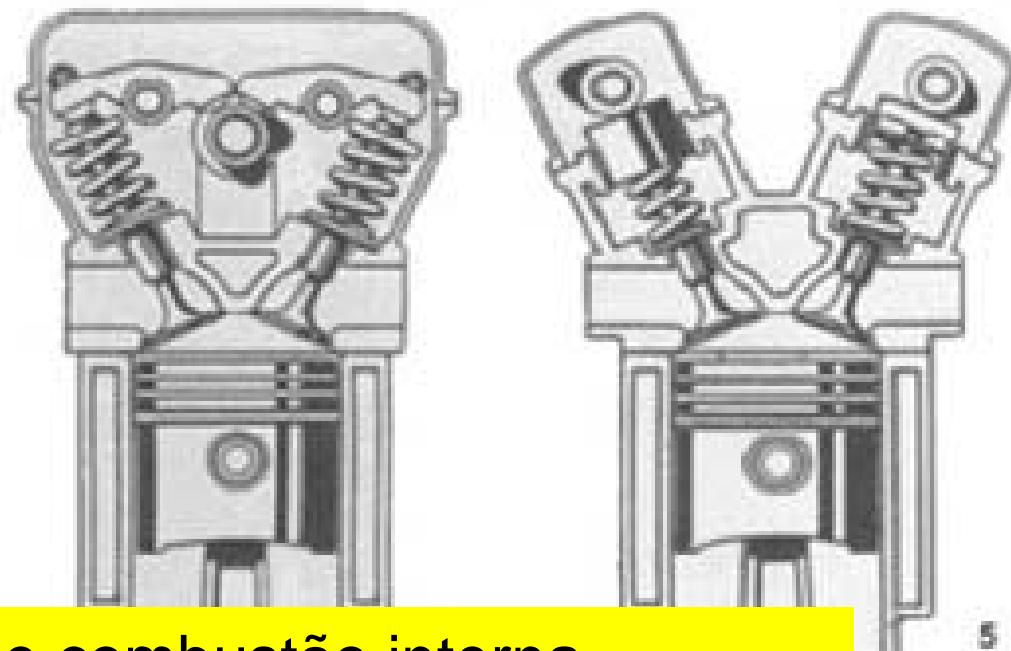
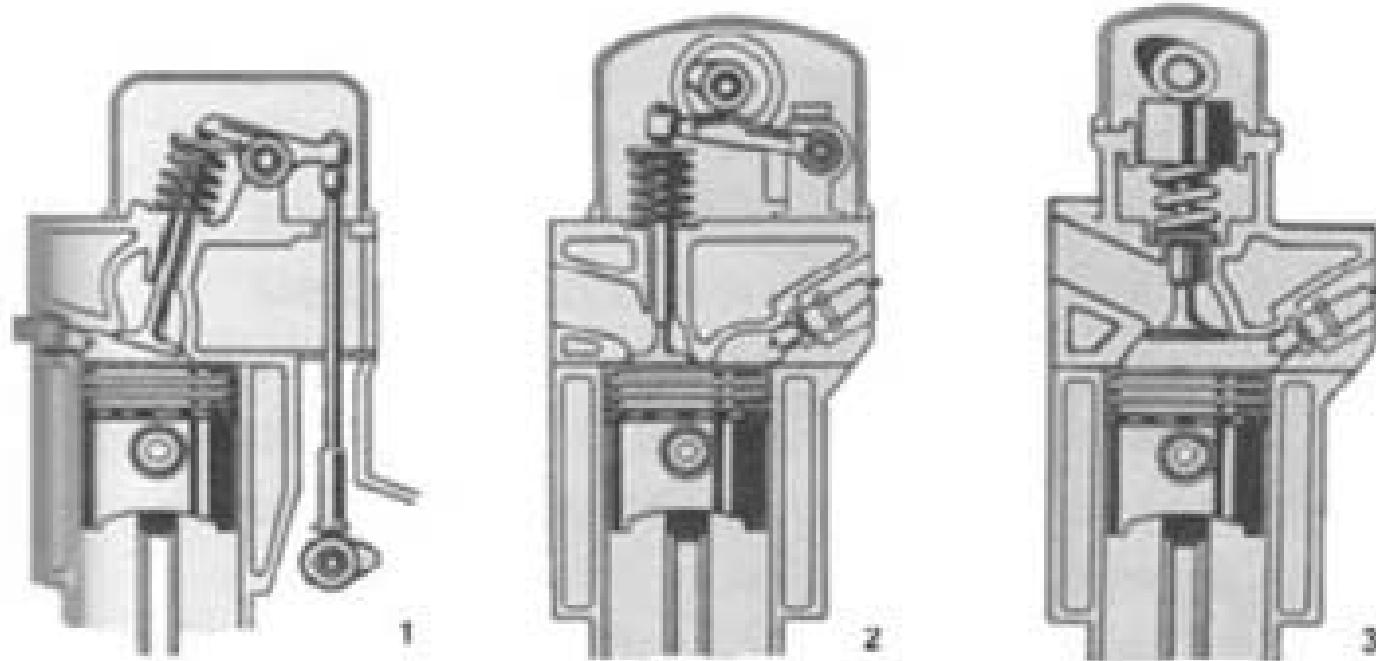
Push Rod Valve Gear



Overhead
Camshaft

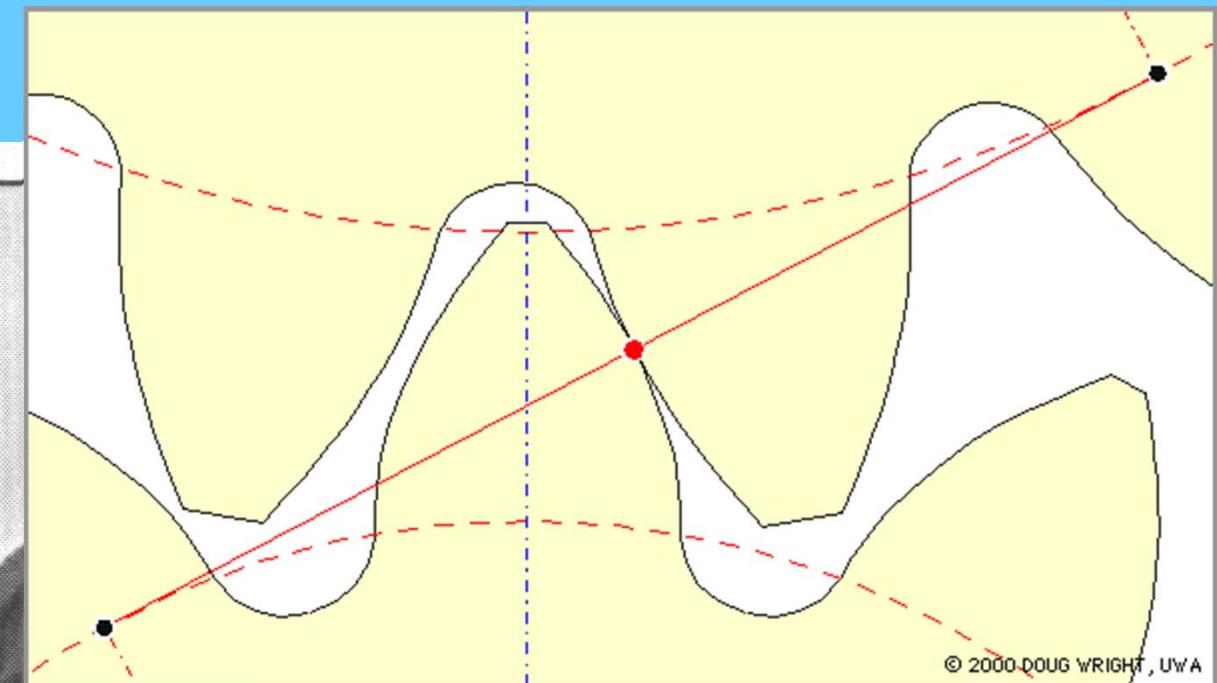
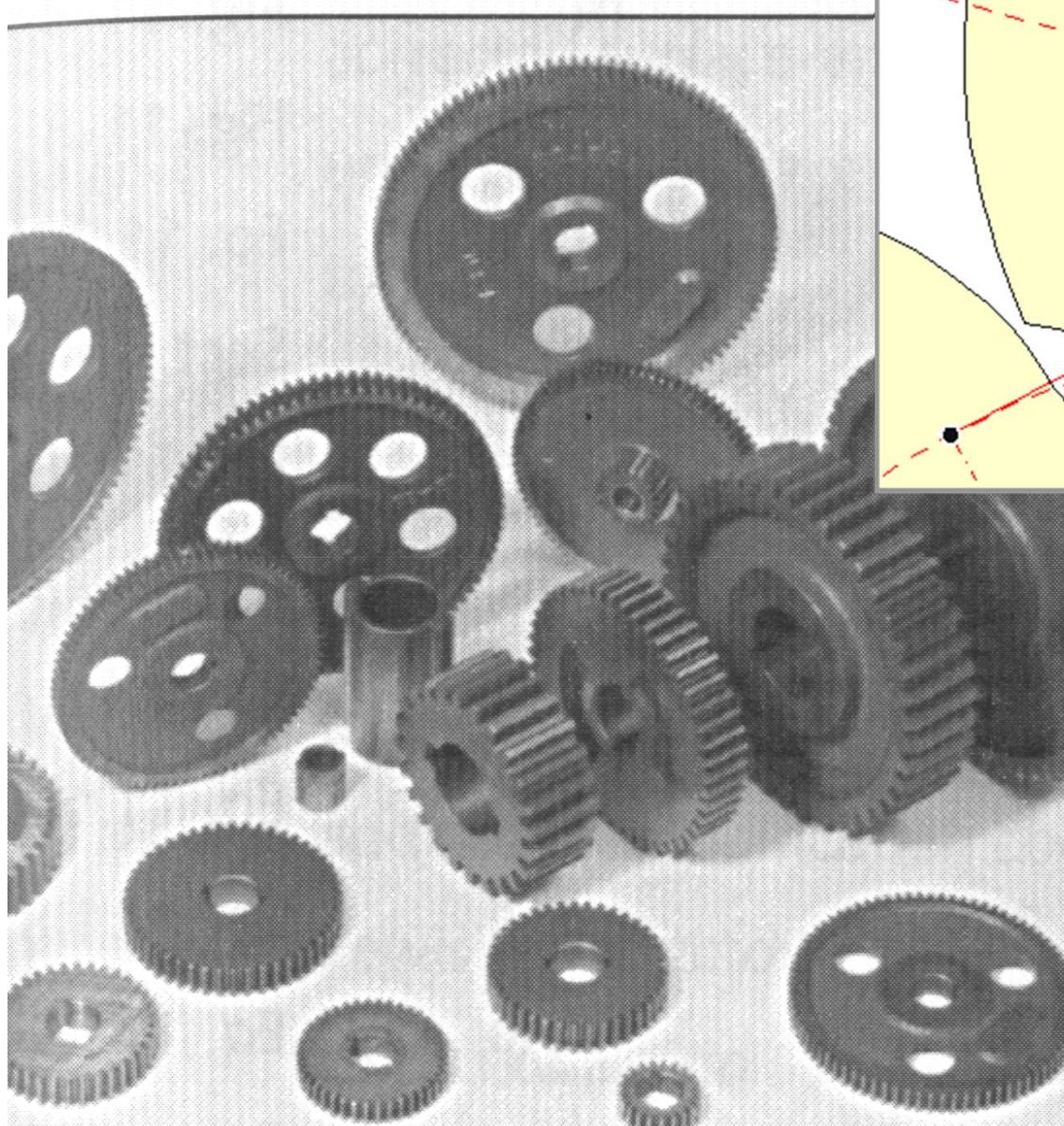
DIFERENTES TIPOS DE ACCIONAMIENTO DE VALVULAS

Cames



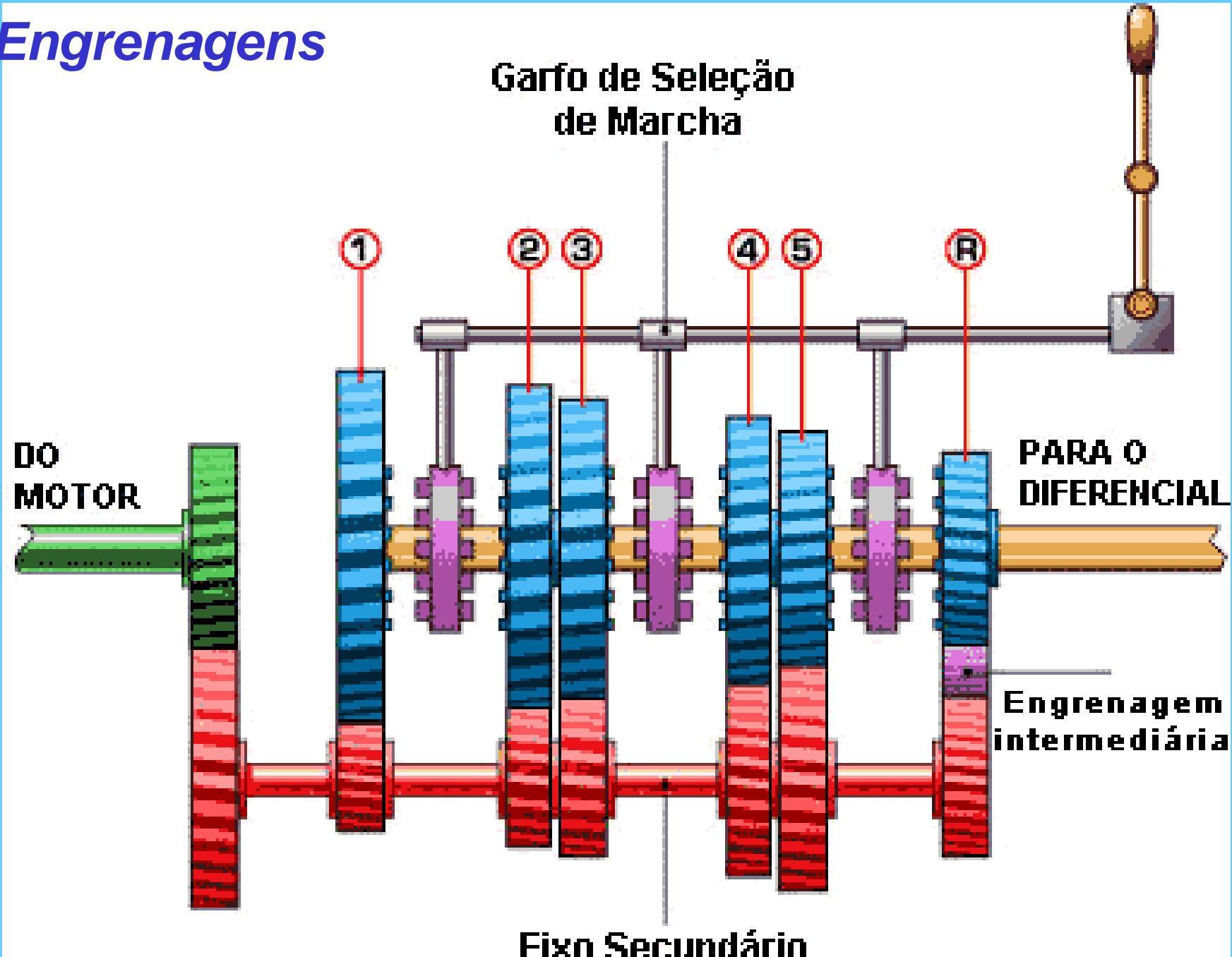
Motores de combustão interna

Engrenagens



Engrenagens

Garfo de Seleção de Marcha



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Engrenagens



Transmissão

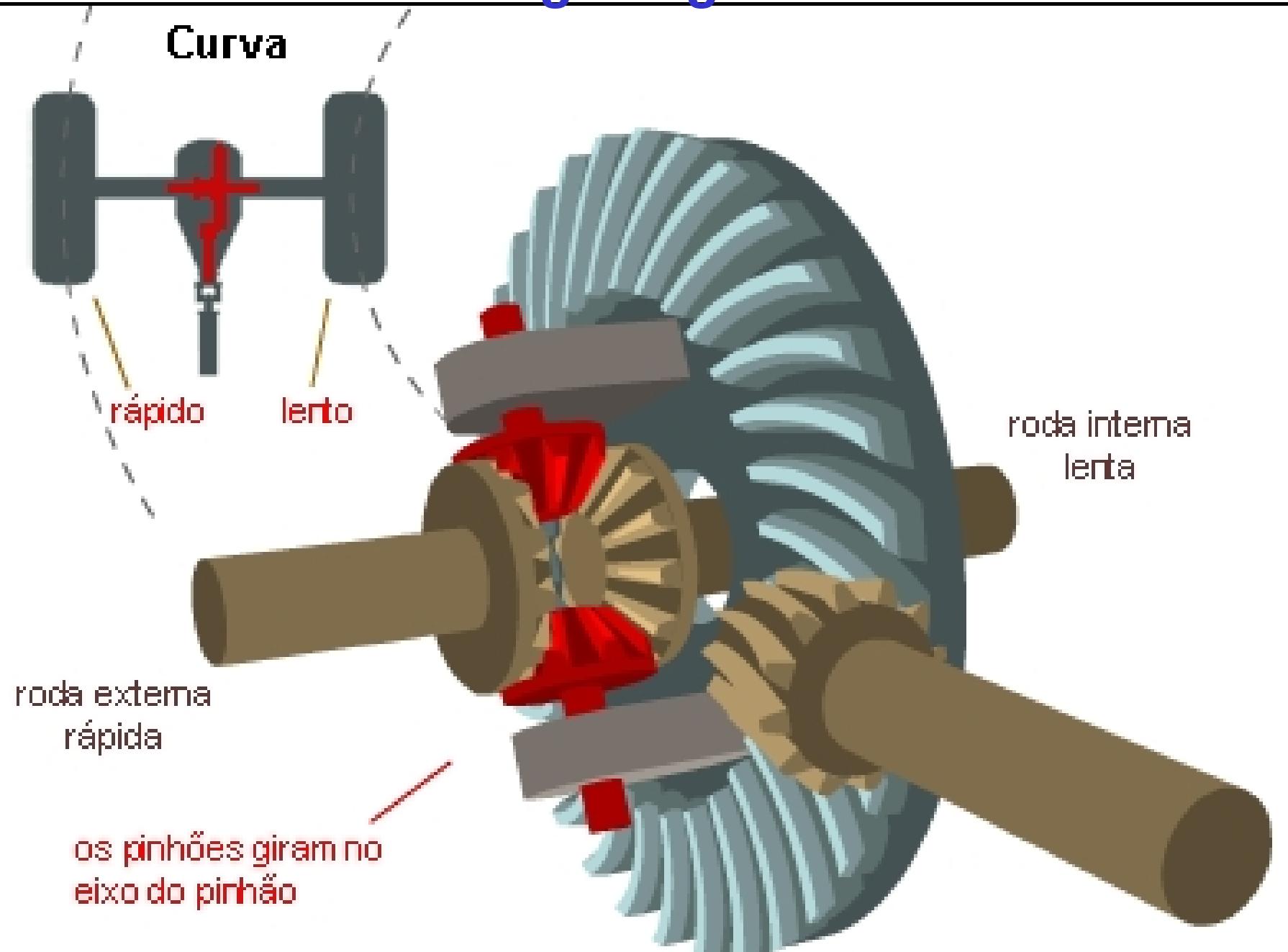
Engrenagens



notícias
automotivas

Transmissão

Engrenagens

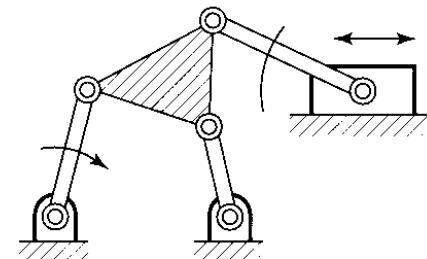


Transmissão - diferencial

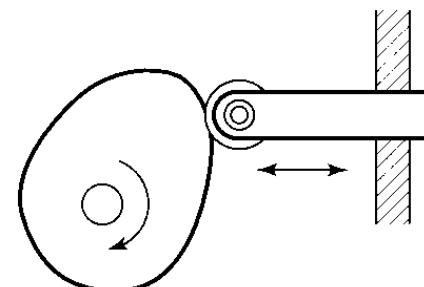
Conteúdo da disciplina

Análise e Síntese de mecanismos:

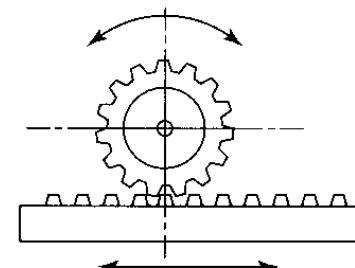
✓ Articulados



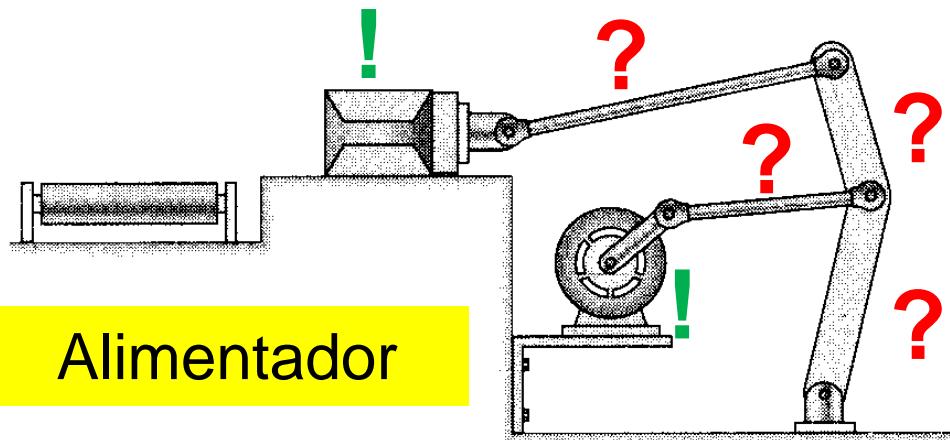
✓ Cames



✓ Engrenagens

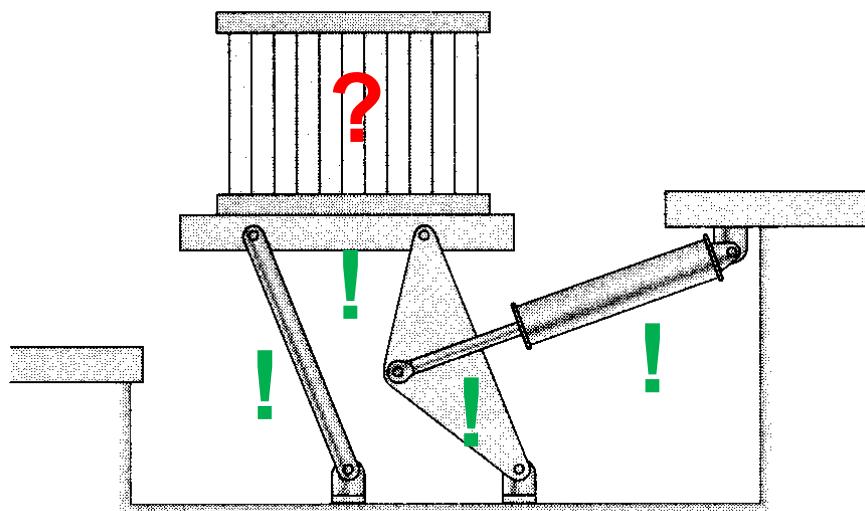


Síntese x Análise



Síntese:

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



Análise:

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

Plataforma de elevação

Síntese x Análise



Comando de admissão
em um motor V6 de 3.6 L

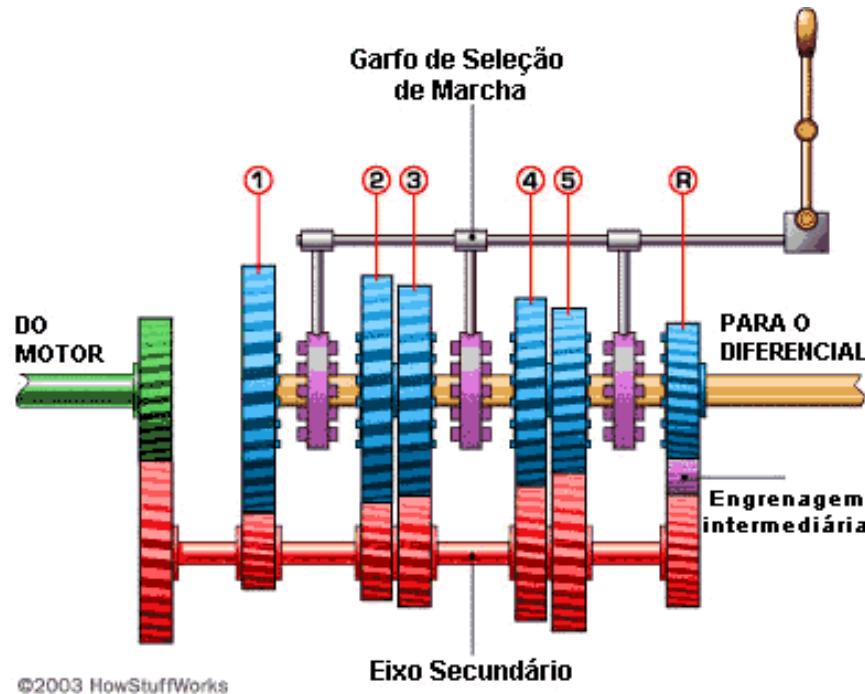
Síntese:

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

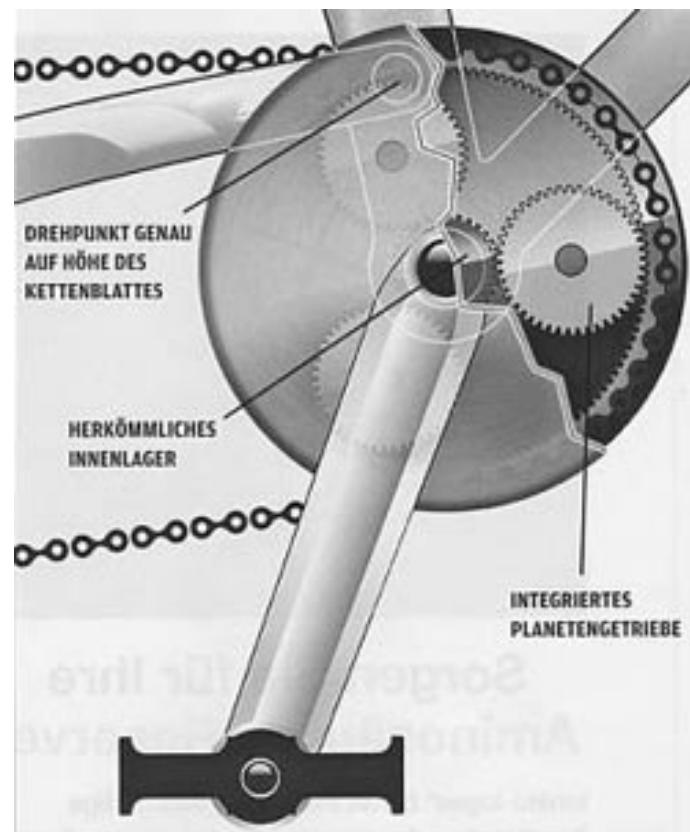
Análise:

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

Síntese x Análise



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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

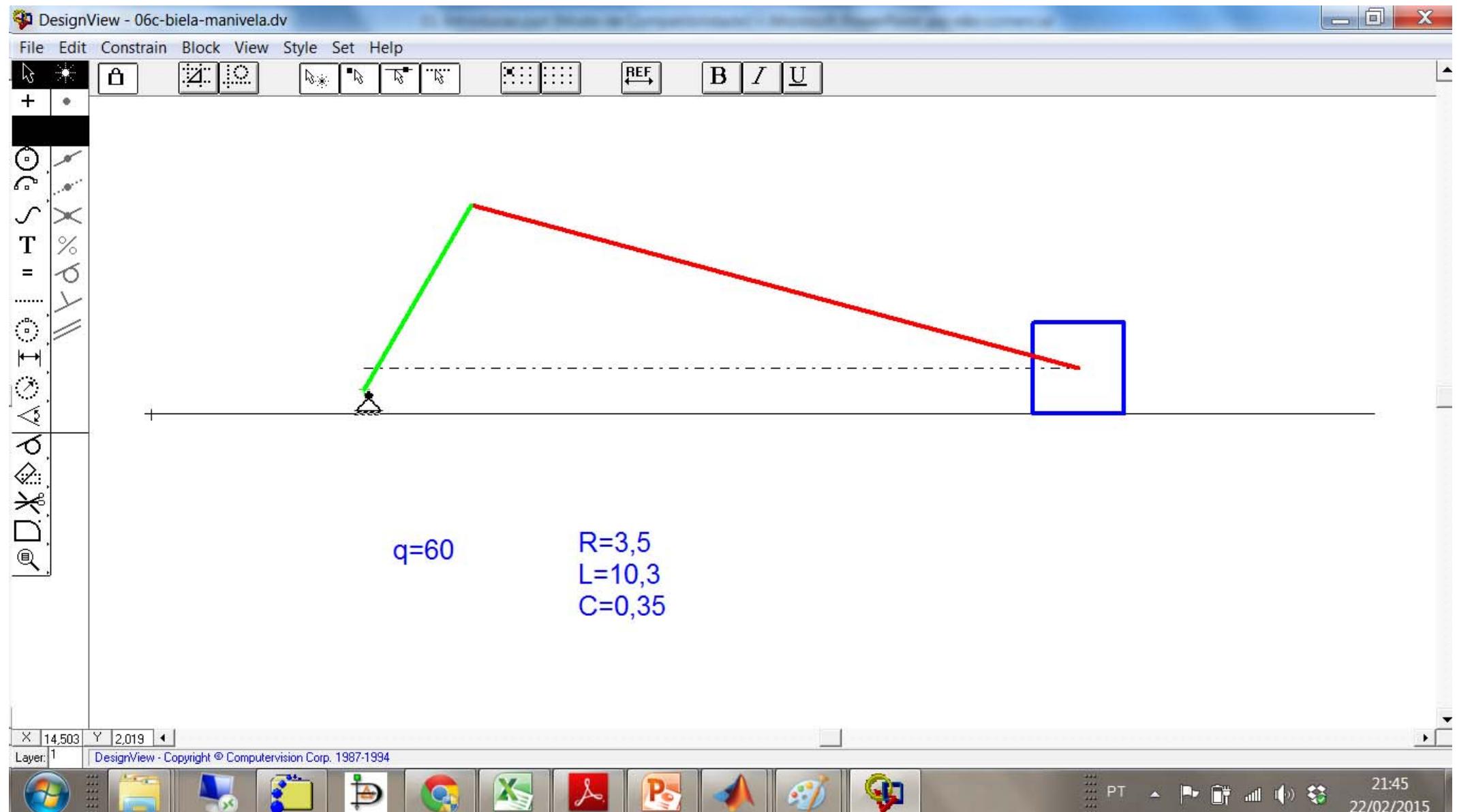
Material de apoio e ferramentas

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

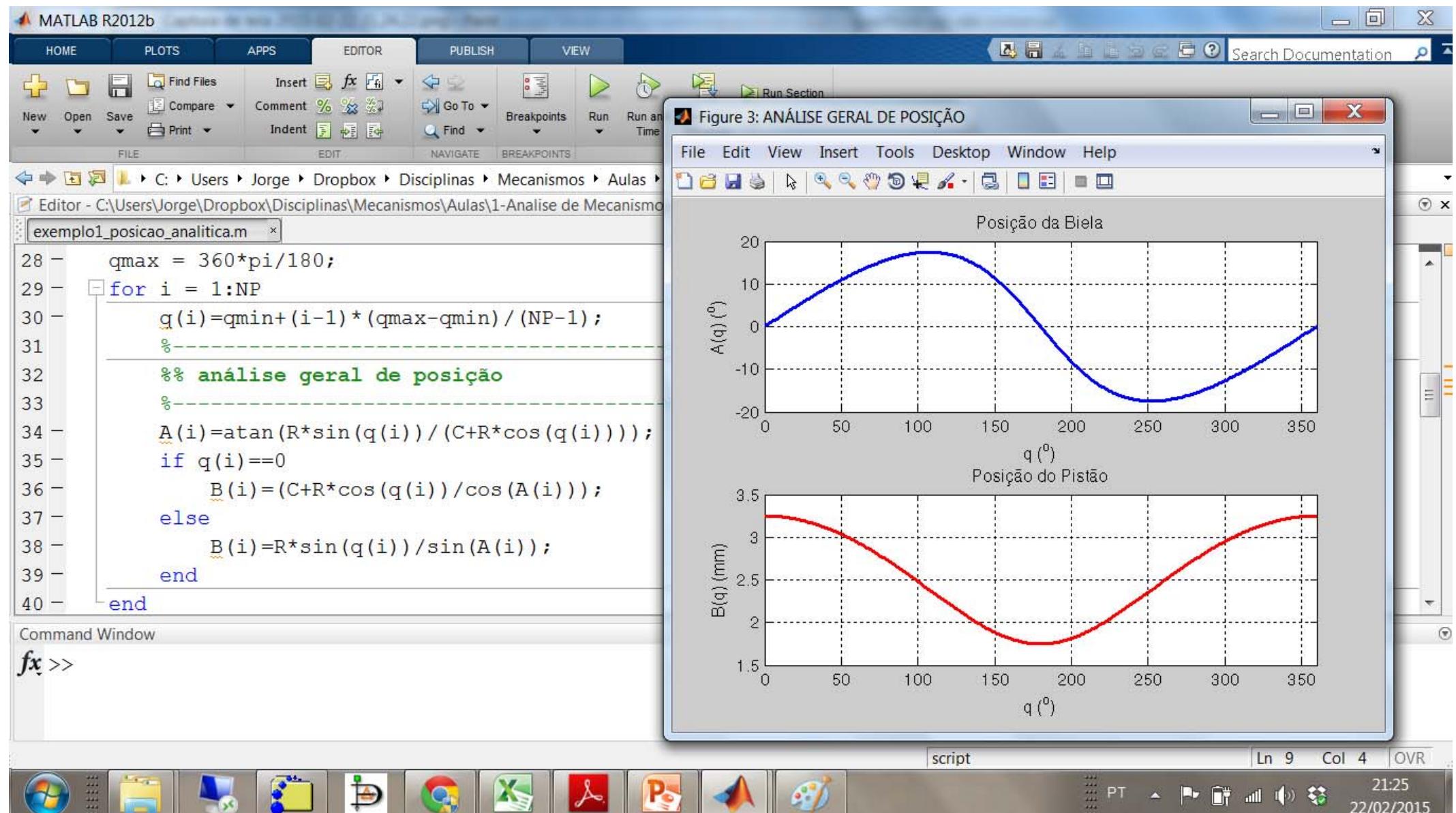
Recomendações

- **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



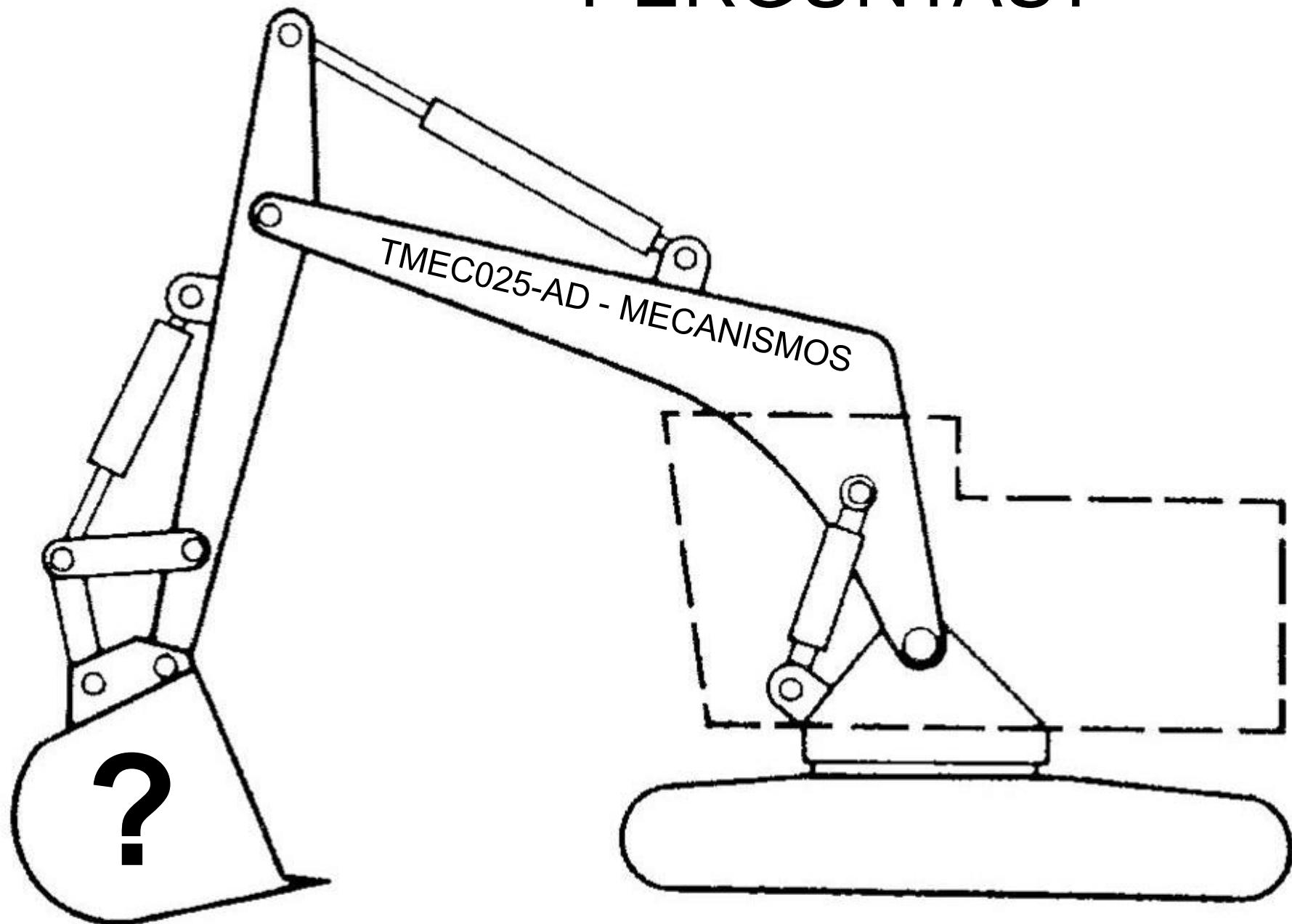
MATLAB



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