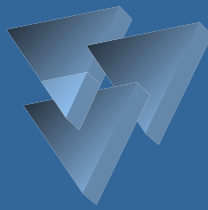
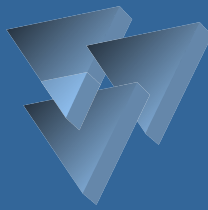


Distribuição em CA



- **R e c e b e e n e r g i a d a c o n c e s s i o n á r i a**
- **T e n s ã o a d e q u a d a p a r a a s r e t i f i c a d o r a s**
- **F o r n e c e p o n t o s d e c o n e x ã o**
 - **S i s t e m a s c o m m u i t a s S E s**
- **M a i o r c o n f i a b i l i d a d e**
 - **F o r n e c e a l t e r n a t i v a s n o c a s o d e f a l h a s**

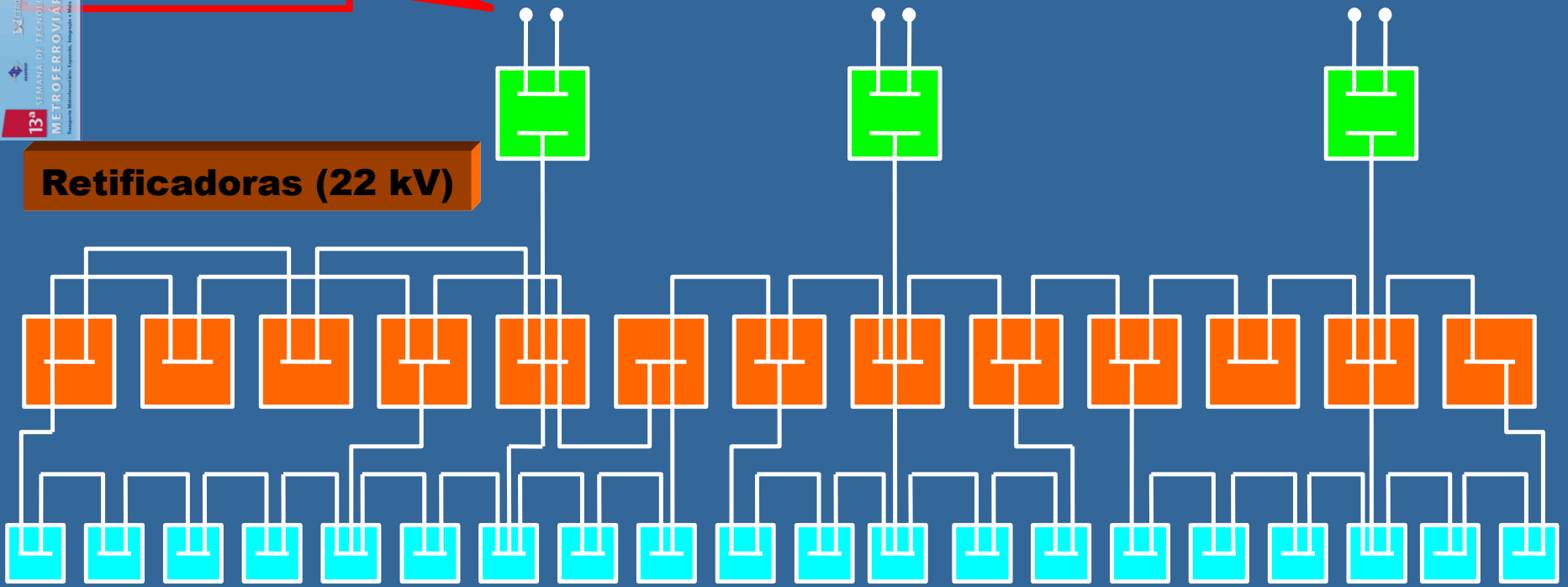
Distribuição em CA



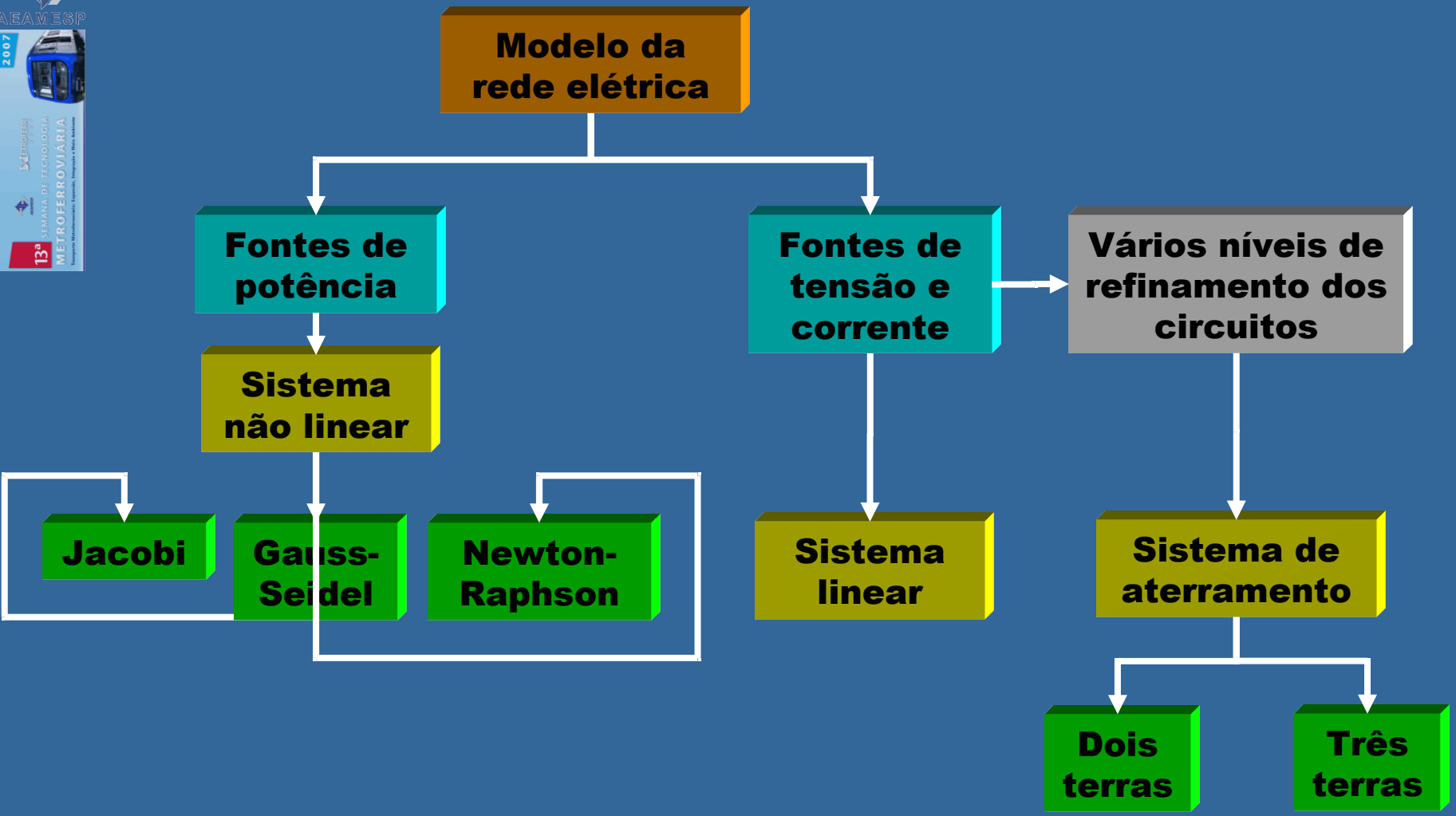
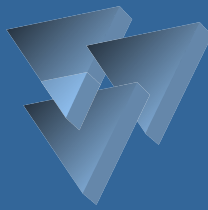
Barramento infinito

Primárias (88 kV)

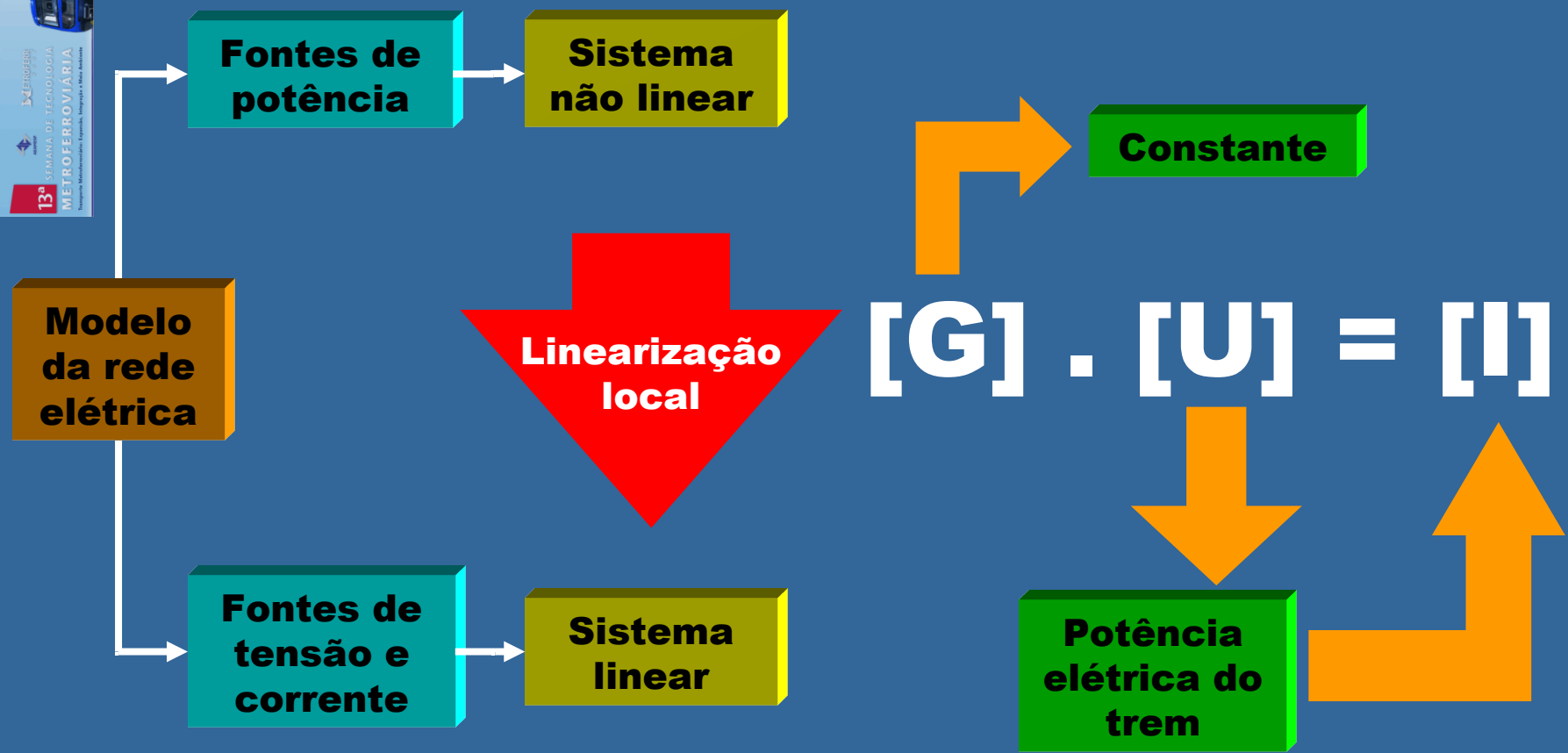
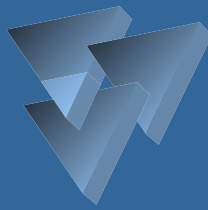
Retificadoras (22 kV)

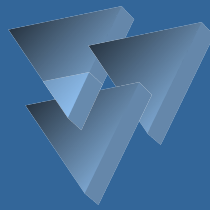


Auxiliares (22 kV)

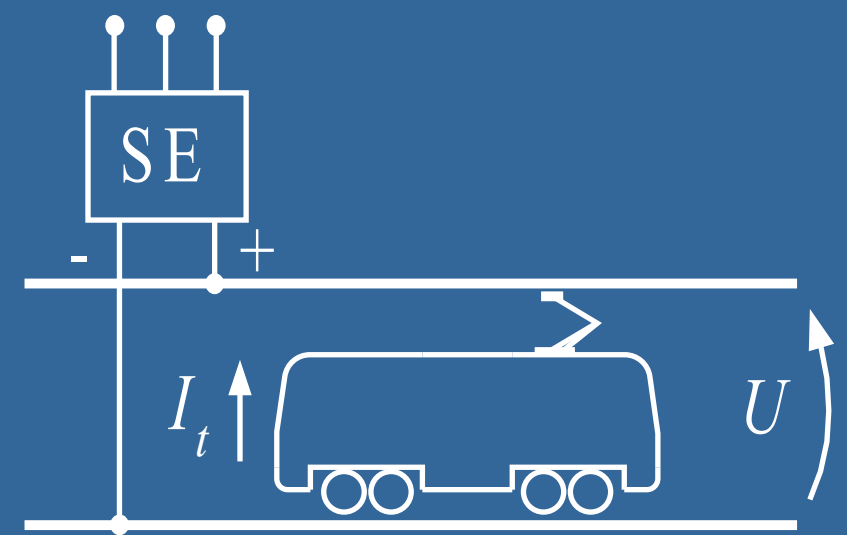
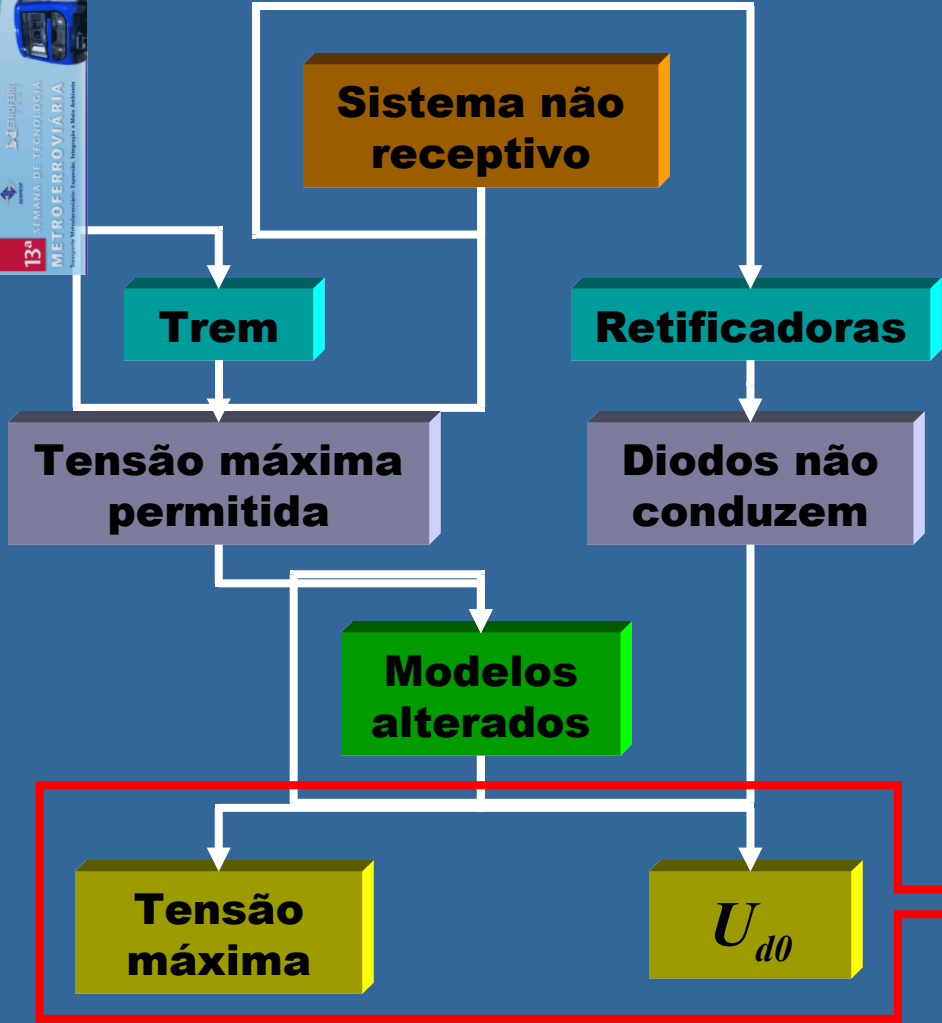


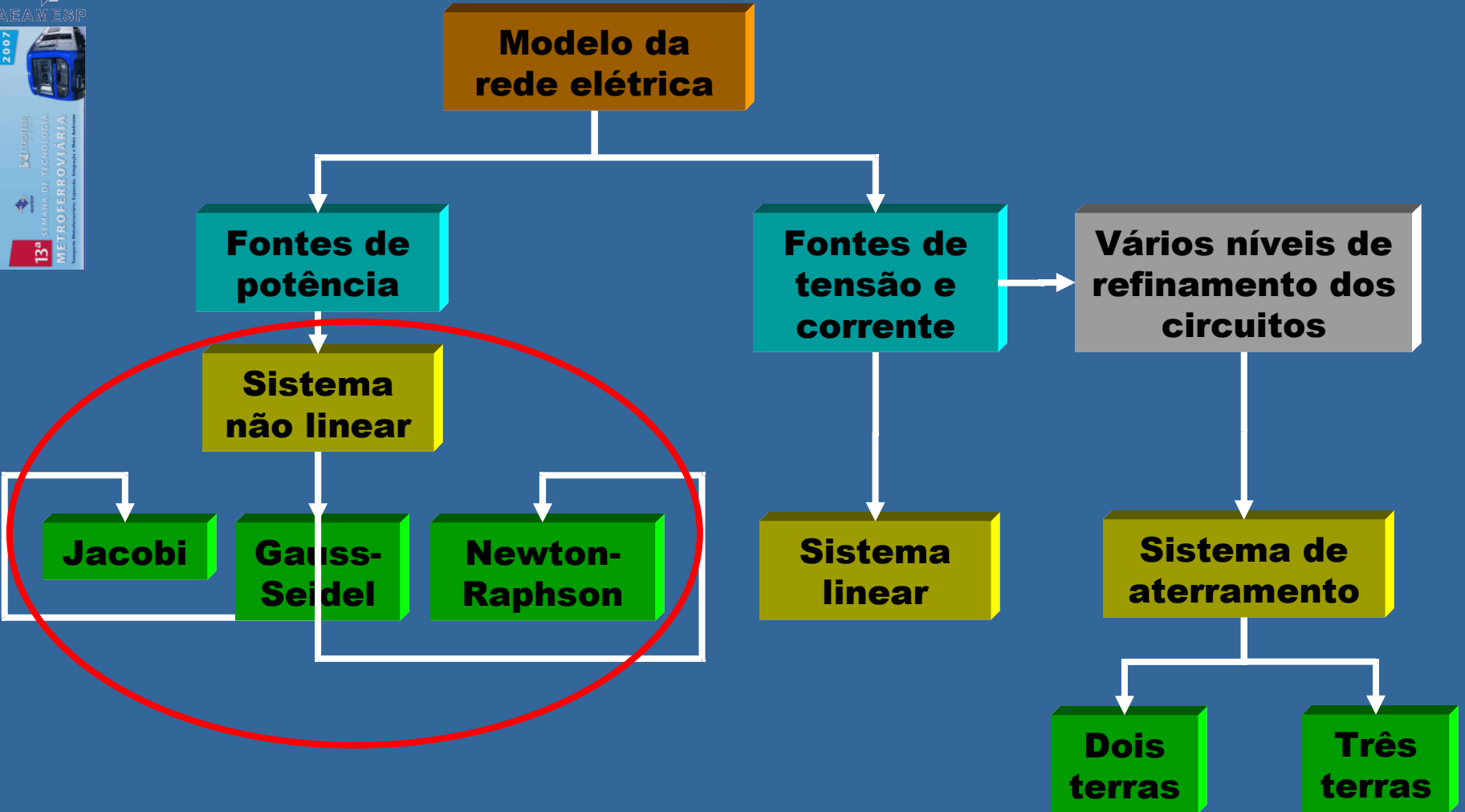
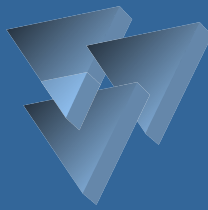
Simulação elétrica



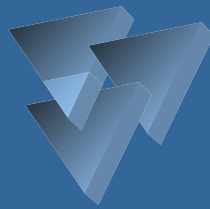


Alimentação regenerativa

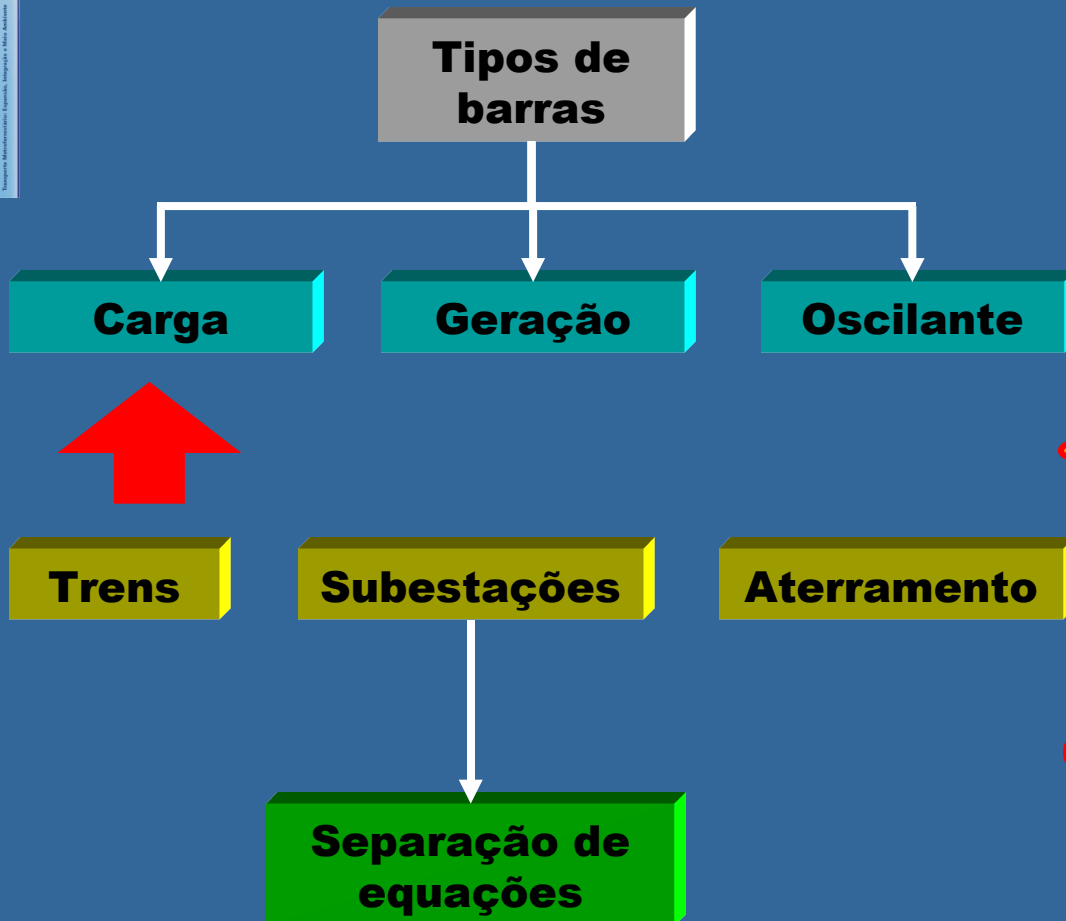




Fluxo de potência



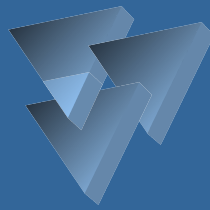
Resolução integrada



$$P_i = U_i \cdot \sum_{j=1}^n G_{ij} \cdot U_j$$



Fluxo de potência



Resolução separada

- Processo iterativo
- Modelagem em CC não é perdida

Potência



Simulação
Elétrica

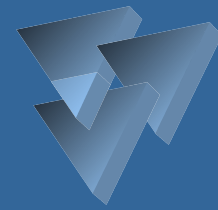
Fluxo de
Potência em CA

Subestações
retificadoras



Tensão

Subestações retificadoras



Ligação

Tensão CC

Fator de potência

**Hexafásica
(1o - triângulo)**

$$U_{d0} = U'_d = \frac{3\sqrt{2}}{\pi} \cdot \frac{U_{s0}}{N_{ps}}$$

$$FP = \frac{3}{\pi}$$

**Dupla estrela
(1o - triângulo)**

$$U_{d0} = U'_d = \frac{3\sqrt{6}}{2 \cdot \pi} \cdot \frac{U_{s0}}{N_{ps}}$$

$$FP = \frac{3}{\pi}$$

**Ponte simples
(1o - estrela)**

$$U_{d0} = U'_d = \frac{3\sqrt{6}}{\pi} \cdot \frac{U_{s0}}{N_{ps}}$$

$$FP = \frac{3}{\pi}$$

**Ponte dupla série
(1o - estrela)**

$$U_{d0} = U'_d = \frac{6\sqrt{6}}{\pi} \cdot \frac{U_{s0}}{N_{ps}}$$

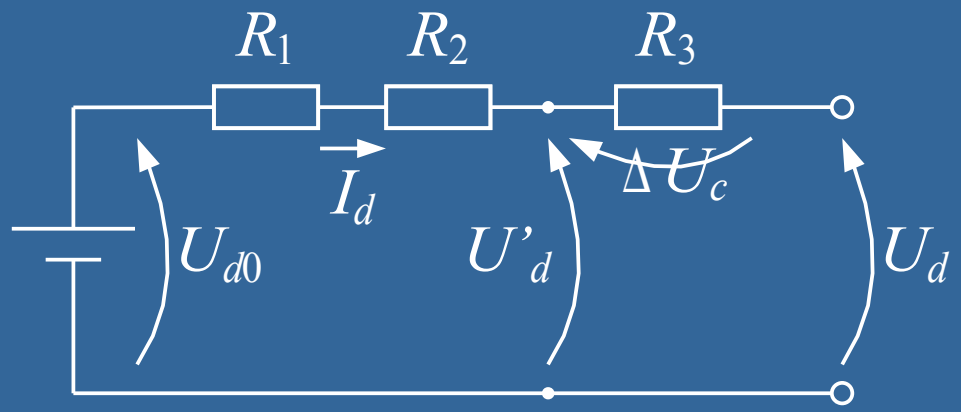
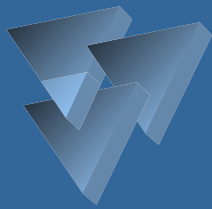
$$FP = \frac{1}{\sqrt{\frac{1}{18} + \frac{\sqrt{3}}{36}} \cdot \pi}$$

**Ponte dupla paralela
(1o - estrela)**

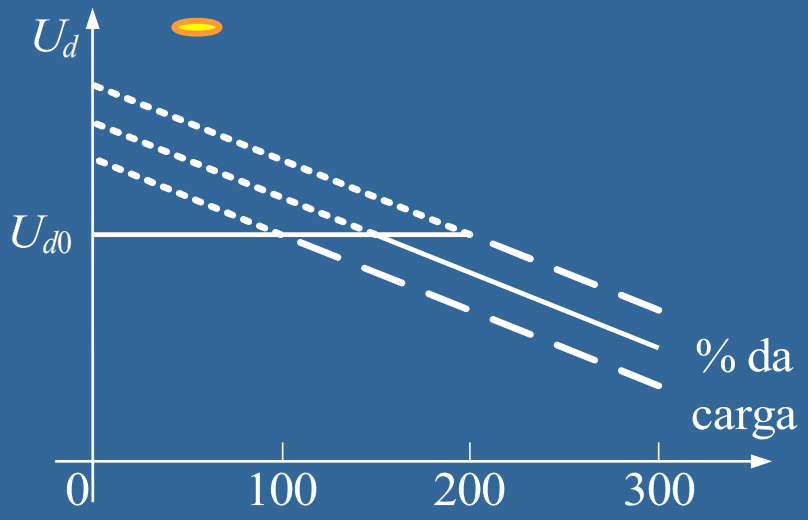
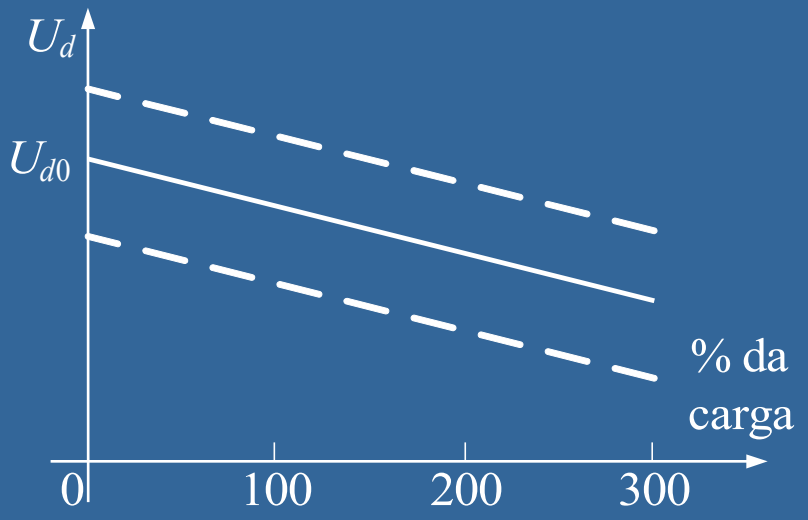
$$U_{d0} = U'_d = \frac{3\sqrt{6}}{\pi} \cdot \frac{U_{s0}}{N_{ps}}$$

$$FP = \frac{1}{\sqrt{\frac{1}{18} + \frac{\sqrt{3}}{36}} \cdot \pi}$$

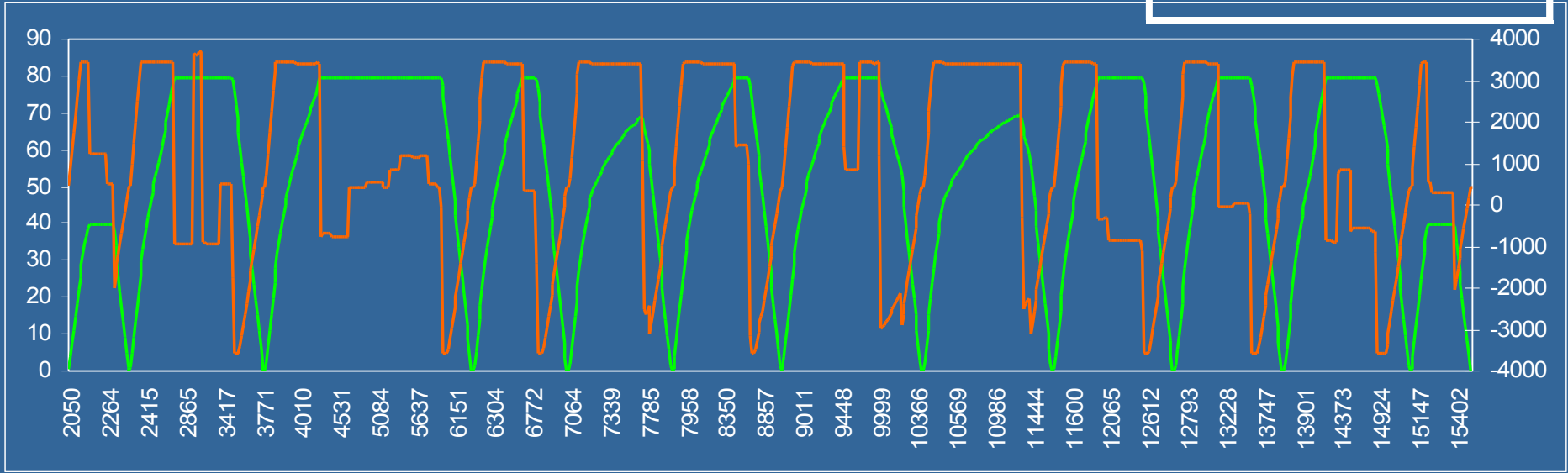
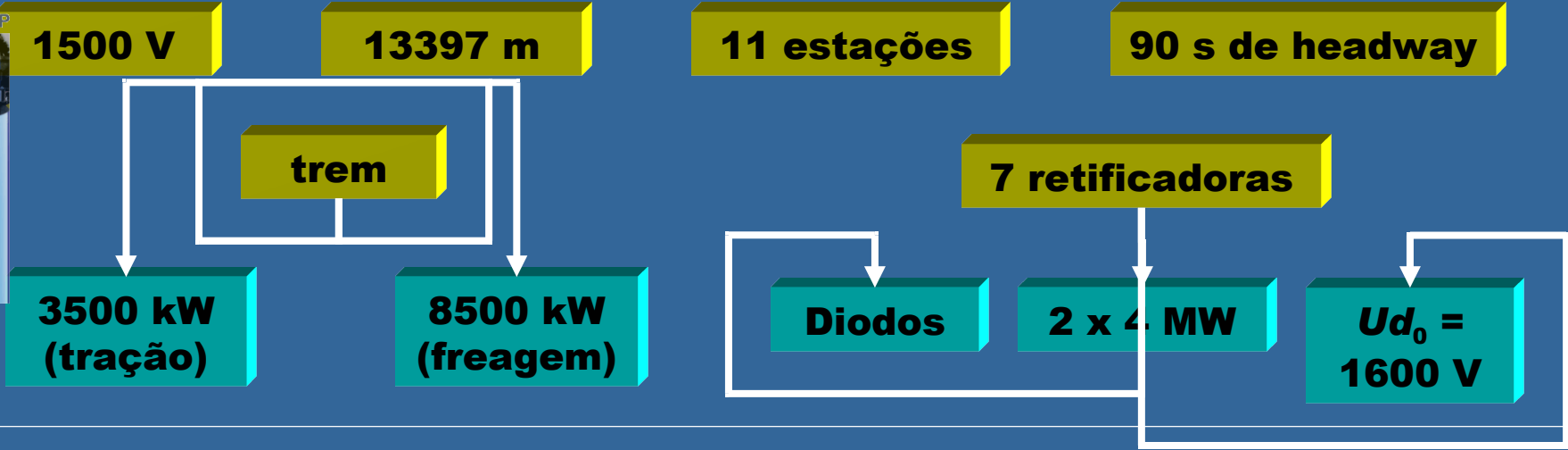
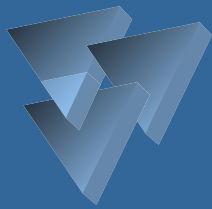
Subestações retificadoras



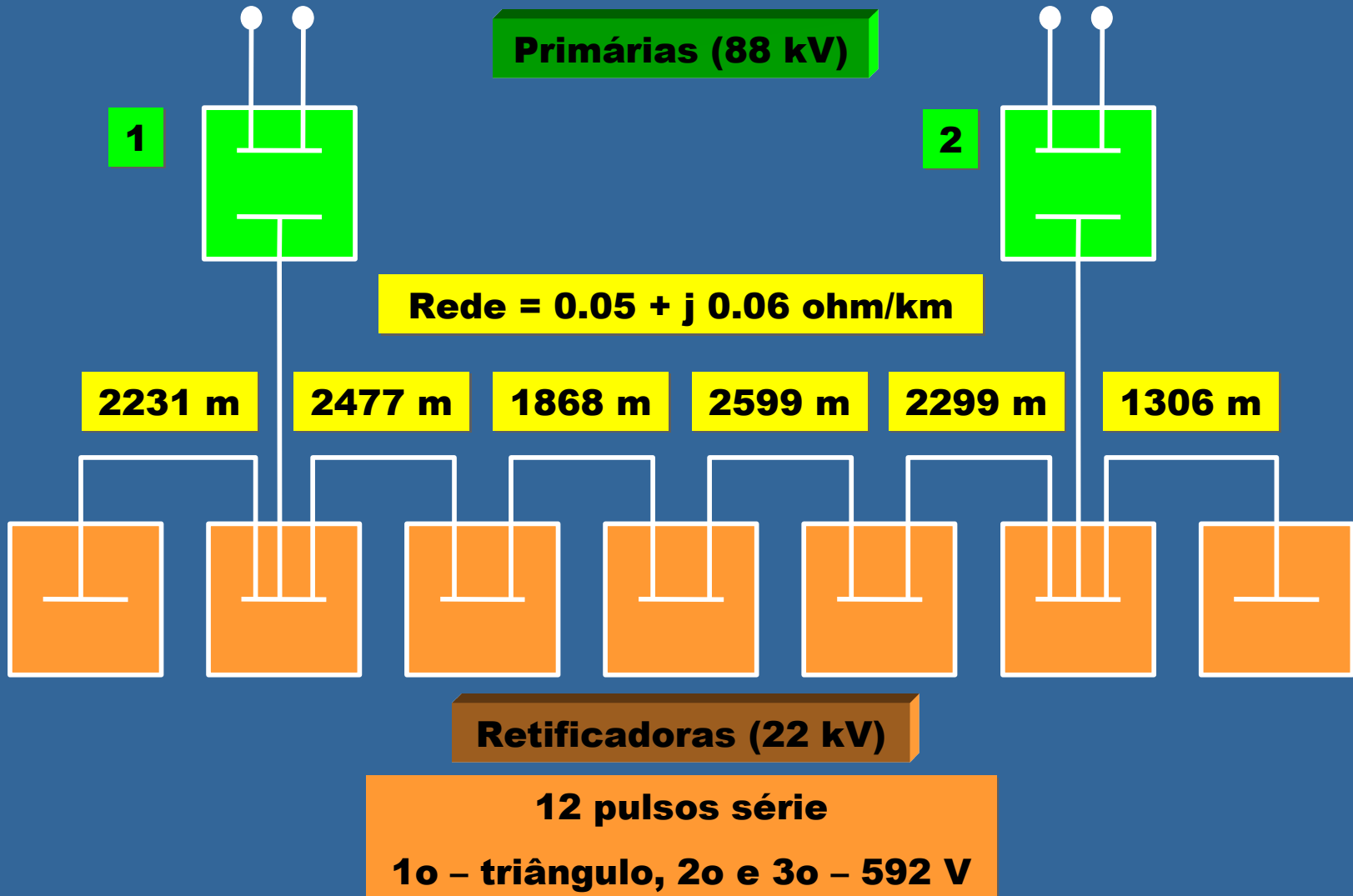
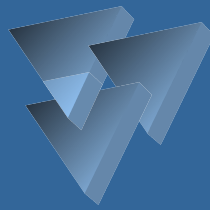
Freagem regenerativa..



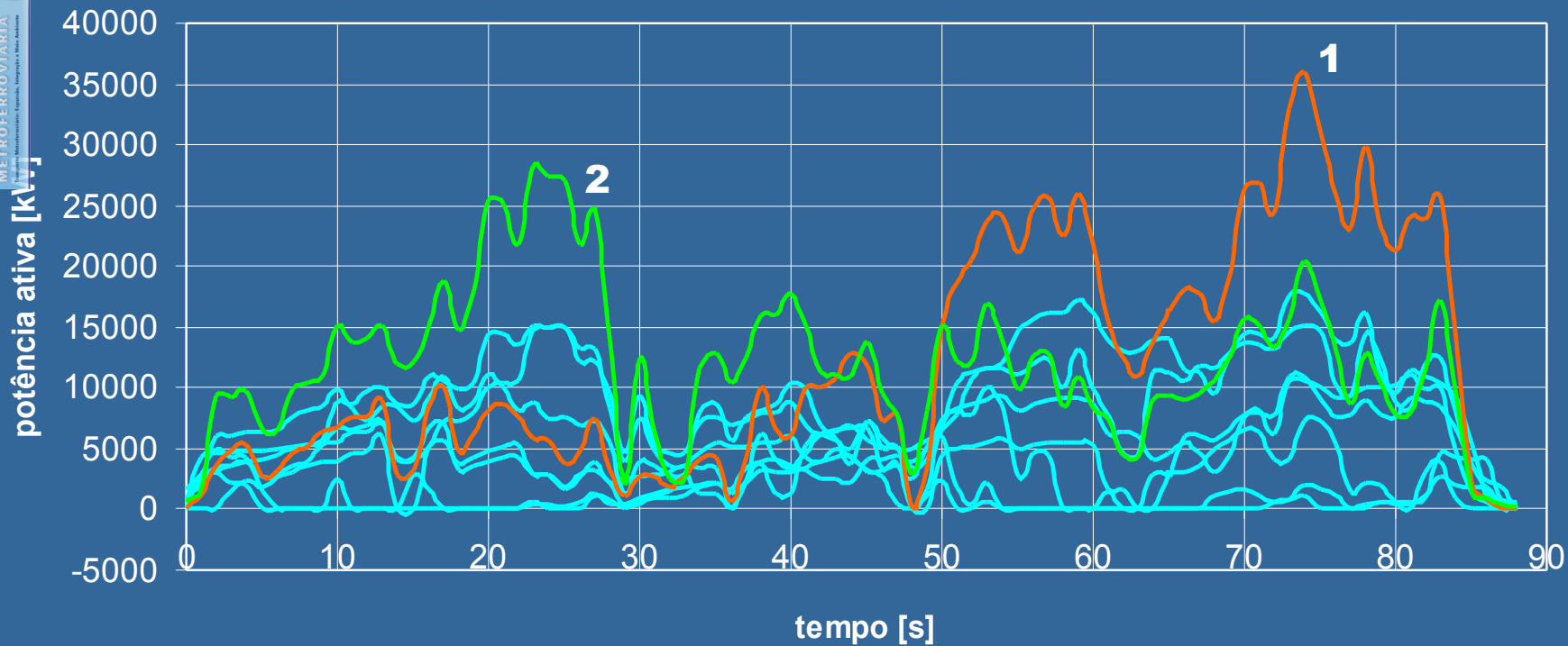
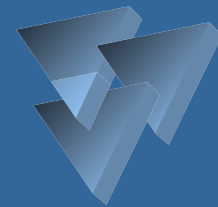
Exemplo de aplicação



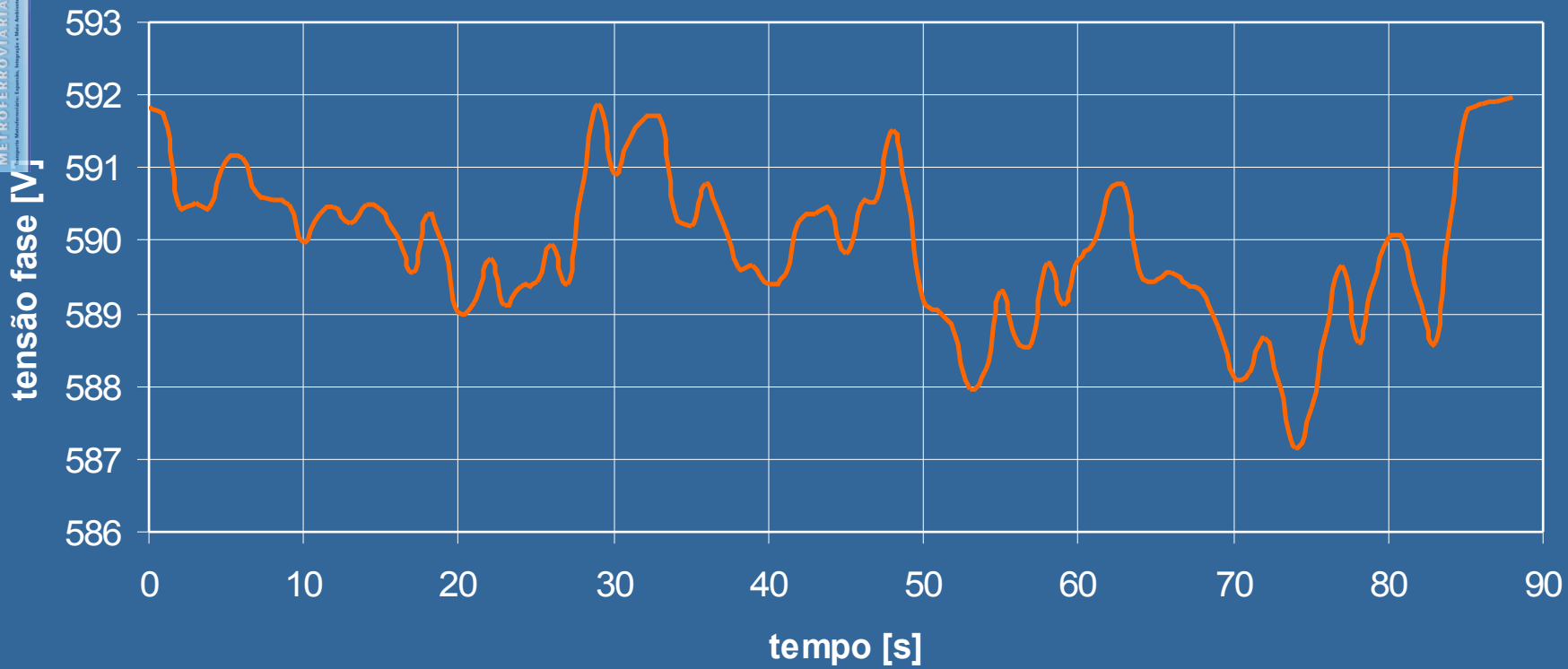
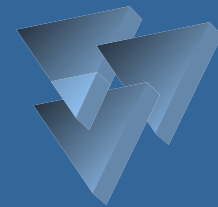
Exemplo de aplicação



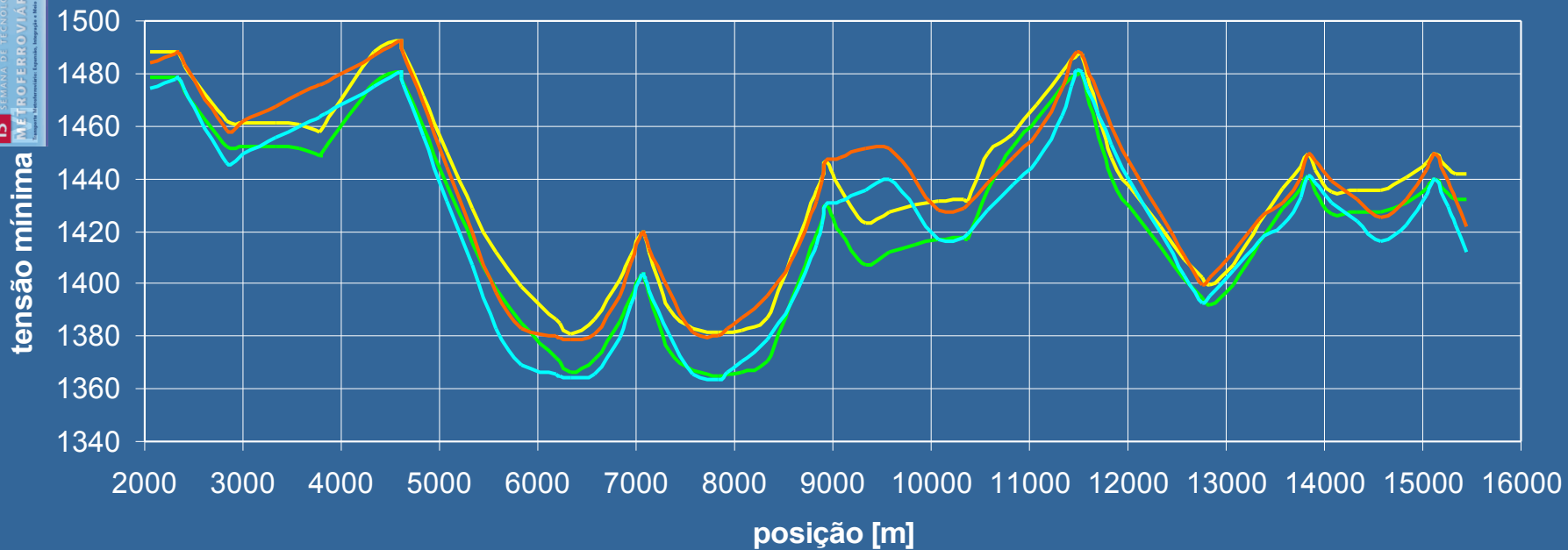
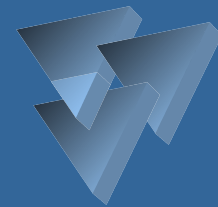
Exemplo de aplicação



Exemplo de aplicação



Exemplo de aplicação





AEAMESP

2007



13ª SEMANA DE TECNOLOGÍA METROFERROVIARIA

Asociación Española de Empresas de Metro y Tranvía



Obrigado