

Jednoduchý model stability alternátoru

Description

Jednoduchý model stability alternátoru - stabilní varianta - doba vypnutí za 0.2 sec, avšak uplatn na jak nárazová regulace buzení, tak i p ídavná nárazová regulace turbíny a ventila ní tlumení.

$$\frac{d\vartheta'}{dt} = \Delta\omega$$

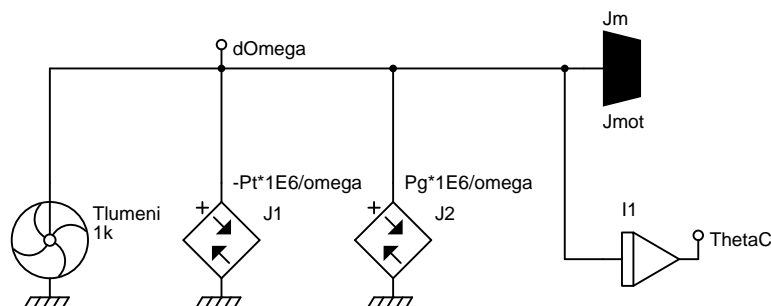
$$\frac{d\Delta\omega}{dt} = \frac{1}{J_{mot}} \cdot \Delta M = \frac{1}{J_{mot}} \cdot \left(\frac{P_t}{\omega} - \frac{P_g}{\omega} \right)$$

$$P_g = P_{max} \cdot \sin \vartheta'$$

System Parameters

$time1 = 0.5$	[sec]	Cas vzniku poruchy
$time2 = 0.7$	[sec]	Cas vypnuti poruchy
$\omega = 100\pi$	[rad/s]	Synchronni uhlova rychlost soustroji
$P_{1max} = 678$	[MW]	Maximalni cinny vykon alternatoru v predporuchovem stavu
$P_{2max} = 0$	[MW]	Maximalni cinny vykon alternatoru v dobe poruchy
$P_{3max} = 623$	[MW]	Maximalni cinny vykon alternatoru v dobe po odpojeni poruchy
$T_m = 5$	[s]	Casova konstanta soustroji
$P_{ng} = 500$	[MW]	Jmenovity cinny vykon soustroji
$T_{buz} = 0.5$		
$T_{tur} = 2$		

Model



Data

*: Jednoduchý model stability alternátoru

*SYSTEM;

time1=0.5; :: [sec] Cas vzniku poruchy

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time2=0.7;    :: [sec] Cas vypnuti poruchy
omega=100pi;  :: [rad/s] Synchronni uhlova rychlost soustroji
P1max=678;    :: [MW] Maximalni cinny vykon alternatoru v predporuchovem stavu
P2max=0;      :: [MW] Maximalni cinny vykon alternatoru v dobe poruchy
P3max=623;    :: [MW] Maximalni cinny vykon alternatoru v dobe po odpojeni poruchy

Tm=5;         :: [s] Casova konstanta soustroji
Png=500;      :: [MW] Jmenovity cinny vykon soustroji
Jmot=Tm*Png*1E6/(omega*omega);

Tbuz=0.5;
RegBuzeni=1+(TIME>=time1)*(1-EXP(-(TIME-time1)/Tbuz))*1.5;

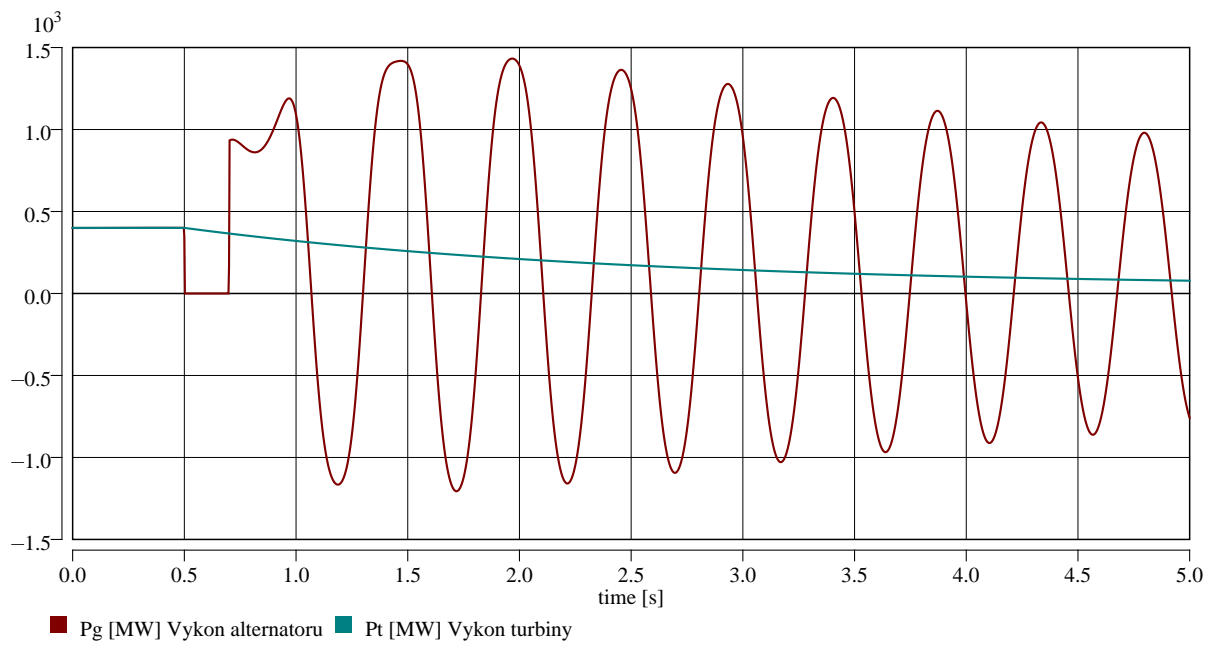
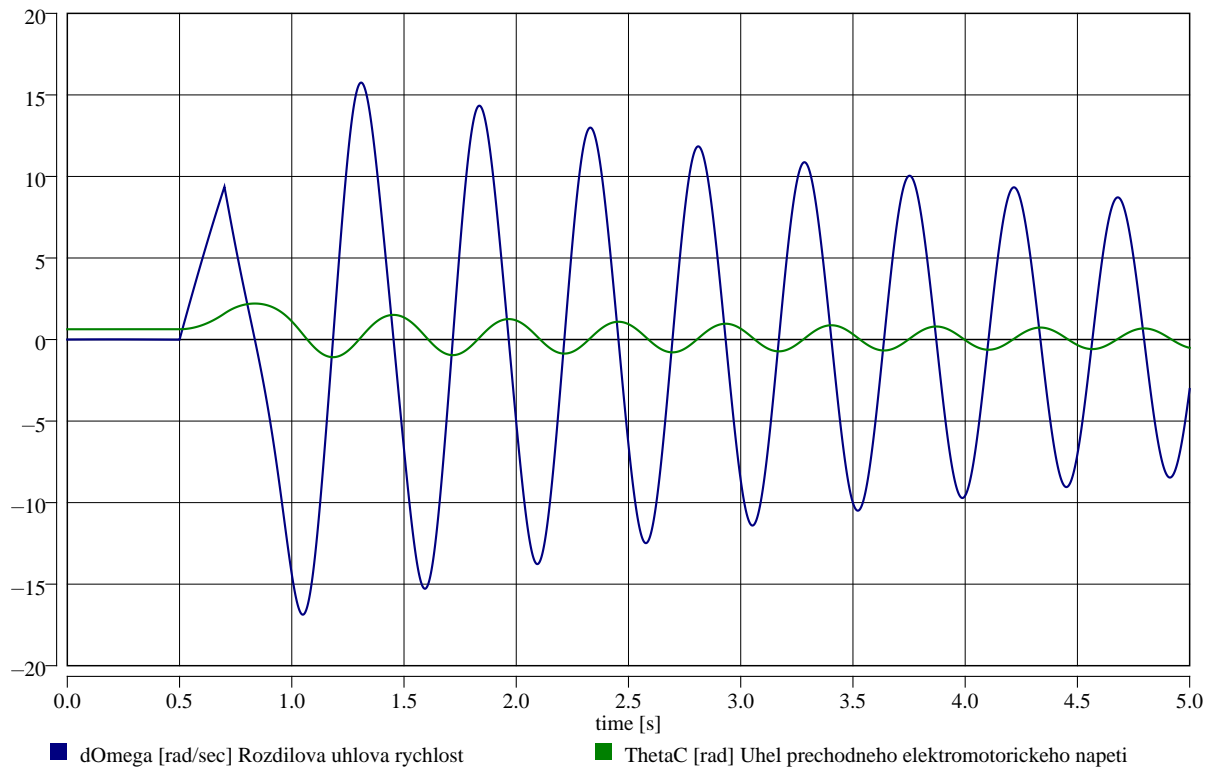
Pg=RegBuzeni*(
  P1max*sin(ThetaC)*(time<time1)+
  P2max*sin(ThetaC)*(time>=time1)*(time<time2)+
  P3max*sin(ThetaC)*(time>time2));
:: [MW] Vykon alternatoru

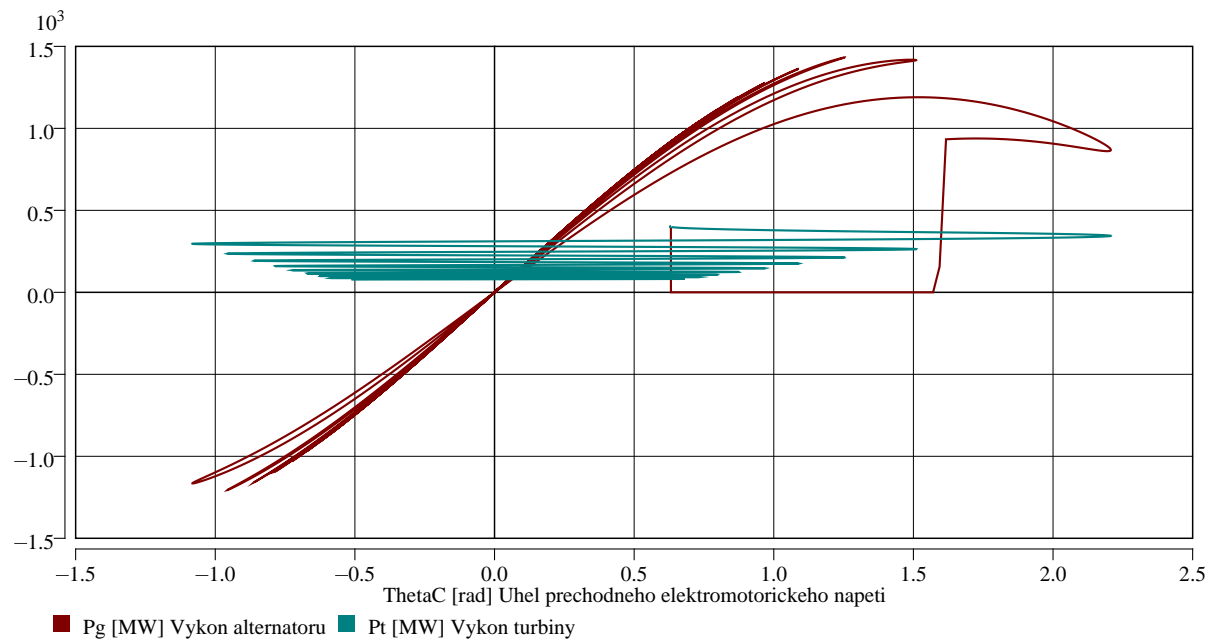
Ttur=2;
RegTurbiny=1-(TIME>=time1)*(1-EXP(-(TIME-time1)/Ttur))*0.9;
Pt=RegTurbiny*400;
:: [MW] Vykon turbiny

J1 dOmega = -Pt*1E6/omega;
J2 dOmega = Pg*1E6/omega;
Jm > C dOmega = Jmot;
I1 > @Int dOmega,ThetaC;

Tlumeni > @fan dOmega,0 / lk;
*TR;
TR 0 5;
PRINT(2001) dOmega, ThetaC, Pg, Pt;
INIT ThetaC=0.63;
RUN;
*END;
:: dOmega [rad/sec] Rozdilova uhlova rychlost
:: ThetaC [rad] Uhel prechodneho elektromotorickeho napeti

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Origin

Karel Nohac, KEE, FEL, ZCU v Plzni

Last Update

December 18, 2023