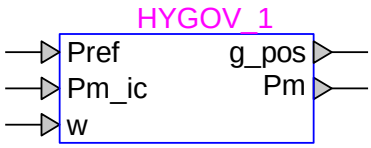
Exciters and Governors: Governor-Turbine HYGOV



Governor-Turbine HYGOV

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1 Description

This device is an implementation of a general model for turbine and governor HYGOV. This device is implemented as described in [1]. Implementation details can be viewed by inspecting the subcircuit of this device.

1.1 Pins

This device has 5 pins:

Pin name	Type	Description	Units
Pref	Input	Power reference from load controller LCBF1	pu
Pm_ic	Input	Steady-state mechanical power at t = 0, for initialization	pu
w	Input	Mechanical speed	pu
g_pos	Output	Gate position	pu
Pm	Output	Turbine mechanical power	pu

1.2 Parameters

The default set of parameters are obtained from [1].

1.2.1 Governor tab

The parameters on the Governor tab are:

1. **Time constant T_G**: gate servo time constant
2. **Time constant T_F**: pilot servo valve time constant
3. **Time constant T_R**: dashpot time constant
4. **Permanent droop R**: permanent droop
5. **Temporary droop r**: temporary droop

6. **Maximum gate velocity V_{ELM}**: maximum gate velocity
7. **Maximum gate opening G_{MAX}**: maximum gate opening
8. **Minimum gate opening G_{MIN}**: minimum gate opening

1.2.2 Turbine tab

The turbine tab allows to input:

1. **Time constant T_W**: water inertia time constant
2. **Damping factor D_T**: turbine damping factor
3. **Gain A_T**: turbine gain
4. **No-load flow Q_{NL}**: no-load flow at nominal head

2 Initial conditions

The initial output is equal to the generator mechanical power (base for power) at t = 0 s.

3 References

[1] "Review of Existing Hydroelectric Turbine-Governor Simulation Models", Argonne national Laboratory, August 2013