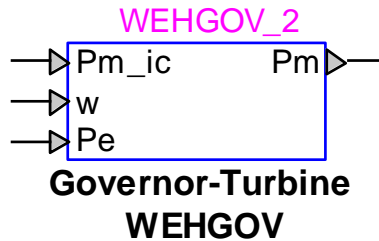


# Exciters and Governors: Governor-Turbine WEHGOV



Exciters and Governors: Governor-Turbine WEHGOV .....	1
1 Description.....	1
1.1 Pins .....	1
1.2 Parameters.....	1
1.2.1 Regulator tab .....	1
2 Initial conditions .....	2
3 References .....	2

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## 1 Description

This device is an implementation of WEHGOV Woodward Electric Hydro Governor Model. 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 4 pins:

Pin name	Type	Description	Units
Pm_ic	Input	Steady-state mechanical power at t = 0, for initialization	pu
w	Input	Mechanical speed	pu
Pe	Input	Electrical power	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 Data tab are:

1. **Gain R\_PERM\_GATE**: permanent droop of gate position
2. **Gain R\_PERM\_PE**: permanent droop of electrical power
3. **Time constant T<sub>PE</sub>**: electrical power transducer time constant
4. **Gain K<sub>P</sub>**: proportional gain of PID controller
5. **Gain K<sub>I</sub>**: integral gain of PID controller
6. **Gain K<sub>D</sub>**: derivative gain of PID controller

7. **Time constant  $T_D$** : derivative time constant
8. **Time constant  $T_P$** : gate servo time constant
9. **Time constant  $T_{DV}$** : time constant
10. **Time constant  $T_G$** : Gate servo time constant
11. **Maximum gate closing velocity  $G_{TMXOP}$** : maximum gate closing velocity
12. **Maximum gate opening velocity  $G_{TMXCL}$** : maximum gate opening velocity
13. **Maximum governor output  $G_{MAX}$** : maximum governor output
14. **Maximum governor output  $G_{MIN}$** : minimum governor output
15. **Deadband width  $DBAND$** : Intentional dead-band width
16. **Gain  $DPV$** : governor limit factor
17. **Gain  $D_{ICN}$** : gate limiter modifier

### 1.2.2 Governor tab

The turbine tab allows to input:

1. **Time constant  $T_W$** : water inertia time constant
2. **Gain  $D_{TURB}$** : turbine damping factor
3. Flow versus gate characteristic (Gate versus Steady state flow qss table)
4. Steady state mechanical power versus flow characteristic (flow q versus steady state power Pss)

## 2 Initial conditions

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

## 3 References

- [1] PSS®E MODEL LIBRARY PSS®E 32.0.5, Siemens Energy, Inc.