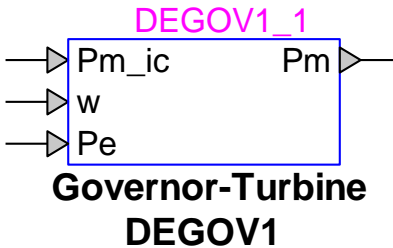


# Exciters and Governors: Governor-Turbine DEGOV1



Exciters and Governors: Governor-Turbine DEGOV1 .....	1
1 Description.....	1
1.1 Pins .....	1
1.2 Parameters.....	1
1.2.1 Regulator tab .....	1
1.2.2 Engine tab.....	2
2 Initial conditions .....	2
3 References .....	2

Tshibain Tshibungu, Jean Mahseredjian, 4/24/2020 3:13 PM

## 1 Description

This device is an implementation of governor-turbine model DEGOV1. 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
Pm	Output	Turbine mechanical power	pu

### 1.2 Parameters

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

#### 1.2.1 Regulator tab

The parameters on the Data tab are:

1. **Droop R**: permanent droop
2. **Time constant  $T_1$** : regulator time constant
3. **Time constant  $T_2$** : regulator time constant
4. **Time constant  $T_3$** : regulator time constant
5. **Time constant  $T_E$** : power time constant
6. Feedback control: see explanations below.

There are two possible selections for the feedback control option:

1. Throttle control
2. Electrical power

### 1.2.2 Engine tab

The turbine tab allows to input:

1. **Gain K**: actuator gain
2. **Time constant  $T_4$** : actuator time constant
3. **Time constant  $T_5$** : actuator time constant
4. **Time constant  $T_6$** : actuator time constant
5. **Time constant  $T_D$** : engine time delay
6. **Maximum torque limit  $T_{MAX}$** : maximum torque output
7. **Minimum torque limit  $T_{MAX}$** : minimum torque output

## 2 Initial conditions

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

## 3 References

- [1] "Dynamic Models for Turbine-Governors in Power System Studies," Technical report PES-TR1. IEEE Power & Energy Society Jan 2013.
- [2] P. Kundur, "Power System Stability and Control", McGraw-Hill 1994