

19.2 WT12T1

Two-Mass Turbine Model for Type 1 and Type 2 Wind Generators

This model is located at system bus #_____ IBUS,
 Machine identifier #_____ ID,
 This model uses CONs starting with #_____ J,
 and STATEs starting with #_____ K,
 and VARs starting with #_____ L.

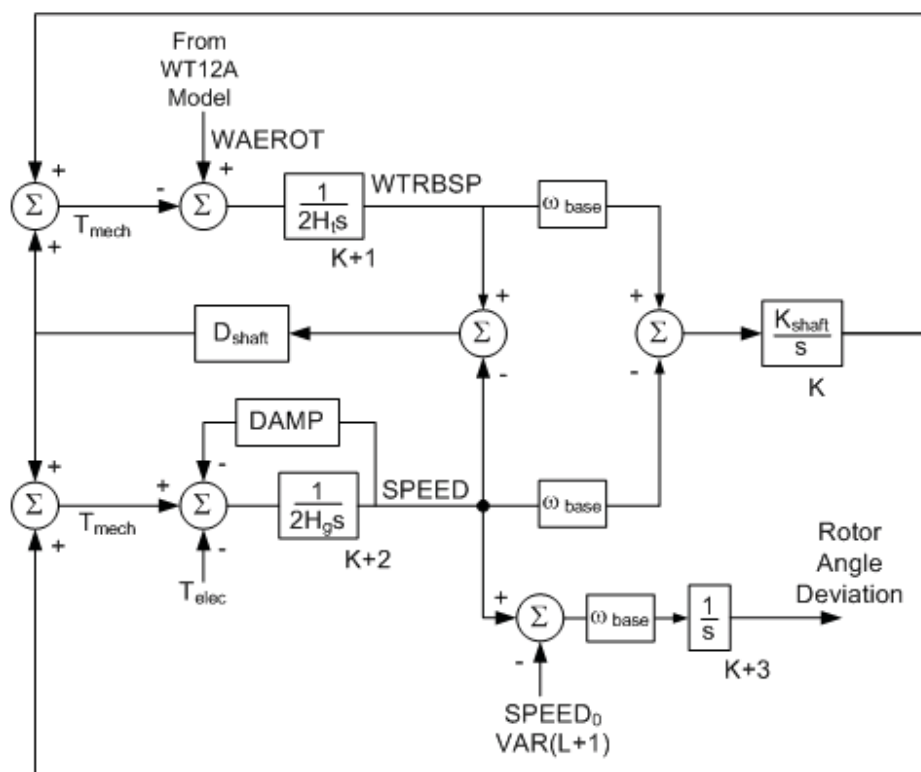
CONs	#	Value	Description
J			H, Total inertia constant, sec
J+1			DAMP, Machine damping factor, pu P/pu speed
J+2			H _{tfrac} , Turbine inertia fraction (H _{turb} /H) ¹
J+3			Freq1, First shaft torsional resonant frequency, Hz
J+4			D _{shaft} , Shaft damping factor (pu)

¹ To simulate one-mass mechanical system, set H_{tfrac} = 0.
 To simulate two-mass mechanical system, set H_{tfrac} as 0 < H_{tfrac} < 1

STATEs	#	Description
K		Shaft twist angle, rad.
K+1		Turbine rotor speed deviation, pu
K+2		Generator speed deviation, pu
K+3		Generator rotor angle deviation, pu

VARs	#	Description
L		P _{aero} on the rotor blade side, pu
L+1		Initial rotor slip
L+2		Initial internal angle

IBUS, 'WT12T1', ID, CON(J) to CON(J+4) /



$$H_t = H \times H_{frac}$$

$$H_g = H - H_t$$

$$K_{shaft} = \frac{2H_t \times H_g \times (2\pi \times Freq1)^2}{H \times \omega_0}$$

Two-Mass Shaft WT12T Model
for Type 1 & 2 Generic Wind Machines

19.3 WT3T1

Mechanical System Model for Type 3 Wind Generator (for WT3G1 and WT3G2)

This model is located at system bus #_____ IBUS,
 Machine identifier #_____ ID,
 This model uses CONs starting with #_____ J,
 and STATEs starting with #_____ K,
 and VARs starting with #_____ L.

In blkmdl, this model requires one reserved ICON.

CONs	#	Value	Description
J			VW, Initial wind, pu of rated wind speed
J+1			H, Total inertia constant, sec
J+2			DAMP, Machine damping factor, pu P/pu speed
J+3			K _{aero} , Aerodynamic gain factor
J+4			Theta2, Blade pitch at twice rated wind speed, deg.
J+5			H _{tfrac} , Turbine inertia fraction (H _{turb} /H) ¹
J+6			Freq1, First shaft torsional resonant frequency, Hz
J+7			D _{shaft} , Shaft damping factor (pu)

¹ To simulate one-mass mechanical system, set H_{tfrac} = 0.
 To simulate two-mass mechanical system, set H_{tfrac} as 0 < H_{tfrac} < 1.

STATEs	#	Description
K		Shaft twist angle, rad.
K+1		Turbine rotor speed deviation, pu
K+2		Generator speed deviation, pu
K+3		Generator rotor angle deviation, pu

VARs	#	Description
L		P _{aero} on the rotor blade side, pu
L+1		Initial rotor slip
L+2		Initial internal angle
L+3		Initial pitch angle
L+4		P _{aero} initial

IBUS, 'WT3T1', ID, CON(J) to CON (J+7) /

