Centaur 40 CHP Unit

Parameter	Symbol	Value
Speed droop	R	0.04
Speed governor time constant (sec)	T_G	0.03
Acceleration controller gain	K_{iAC}	100
Maximum acceleration	$\dot{\omega}_{r,max}$	0.2
Fuel upper limit (pu)	$F_{d,max}$	1.5
Fuel lower limit (pu)	$F_{d,min}$	-0.13
No-load fuel consumption (pu)	k_{NL}	0.24
Valve positioner time constant (sec)	T_{VP}	0.04
Fuel system time constant (sec)	T_{FS}	0.18
Fuel system external feedback loop gain	k_F	0
Radiation shield gain	G_{SH}	0.85
Radiation shield time constant (sec)	T_{SH}	10.2
Thermocouple time constant (sec)	T_{TR}	1.2
Temperature controller constant (℃)	T_t	380
Temperature controller proportional	K_{pT}	3.4
Temperature controller integral	K_{iT}	1
Reference exhaust temperature (℃)	$T_{4,ref}$	465
VIGV controller constant (℃)	T_w	380
Gate position upper limit (pu)	g_{max}	1.0
Gate position lower limit (pu)	g_{min}	0.72
Nominal compressor pressure ratio	PR_n	10
Nominal airflow rate (kg/s)	w_n	18.98
Nominal fuel flow rate (kg/s)	w_{fn}	0.29
Hot-end ratio of specific heats	γ_h	1.33
Cold-end ratio of specific heats	γ_c	1.4
Specific heat of hot-end air at constant pressure (kJ/kg/K)	C_{ph}	1.1569
Specific heat of cold-end air at constant pressure (kJ/kg/K)	C_{pc}	1.0047
Compressor efficiency	η_c	0.86
Combustor efficiency	η_{comb}	0.99
Expansion turbine efficiency	η_t	0.89
Lower heating value of natural gas (kJ/kg)	H	47130
HRSG thermal power coefficient	K	0.0003

PV-VSG

Parameter	Symbol	Value
Dc-link nominal voltage (kV)	$V_{dc.n}$	10
Nominal angular frequency (rad/sec)	ω_n	377
Dc-link capacitor (mF)	C_{dc}	30
Grid nominal voltage (line-to-line) (kV)	-	4.16
Inverter power rating (MVA)	-	10
Boost converter inductance (mH)	-	5

PV shunt capacitance (μF)	C_{pv}	500
LC filter inductance (mH)	-	5
LC filter capacitance (μF)	-	60
$\omega_m - V_{pv}$ droop	D_{pv}	67.4
$V_{dc} - \omega_m$ droop	D_{dc}	318
Damping coefficient	D	0.01
$V - Q$ droop	D_q	2944.2
Nominal reactive power (Mvar)	Q_n	1

Total nominal load: 6.7 MW + j3.024 Mvar