# Data of the 07 Bus Test System

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**Abstract**

This report presents the data from the Brazilian test system. It consists of seven buses and five generators, with generator 7 representing the Southeastern Brazil system (excluded from receiving stabilizers).

The test system consists of seven buses and five generators, with generator 7 representing the Southeastern Brazil system (excluded from receiving stabilizers). Figure 1 brings the single-line diagram of this system, as referenced in [1].

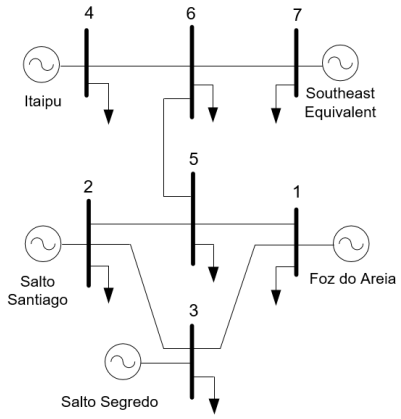


Figure 1: South-Southeastern Brazil equivalent system

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Tables 1-3 present data [1, 2]. The base power is set at 100 MVA. In Table 3, the reactances are expressed in pu, time constants are listed in seconds, inertia constants in seconds, and gains are also provided in pu. The analysis incorporates a static excitation system. A third model represents generators, and the loads follow a constant impedance model in dynamic studies [3].

Table 1: Bus Data

| Node | Type | V (pu) | Gen (MW) | Load (MW) | Load (MVAr) | Shunt (MVAr) |
|---|---|---|---|---|---|---|
| 01 | $PV$ | 1.030 | 1658 | 2405 | -467 | 179.2 |
| 02 | $PV$ | 1.030 | 1332 | 692.3 | -184 | 149.1 |
| 03 | $PV$ | 1.029 | 1540 | 688.2 | -235 | 114.2 |
| 04 | $PV$ | 1.039 | 6500 | 62.6 | 24.3 | 36.8 |
| 05 | $PQ$ | – | – | 845.8 | -9.2 | 33 |
| 06 | $PQ$ | – | – | -4.9 | 79.8 | 2142 |
| 07 | $V\theta$ | 0.966 | – | 2884 | -196 | 42 |

Table 2: Branch Data

| From | To | Resistance (%) | Reactance (%) |
|---|---|---|---|
| 01 | 03 | 0.0300 | 0.3800 |
| 02 | 03 | 0.0500 | 0.7600 |
| 04 | 06 | 0.0290 | 0.7340 |
| 05 | 01 | 0.1900 | 2.4500 |
| 05 | 02 | 0.1500 | 2.2500 |
| 06 | 05 | 0.0000 | 0.3900 |
| 06 | 07 | 0.0400 | 0.5700 |

For nonlinear time-domain simulations, the following limits have been considered [4]:

- Excitation systems: $E_{FD\,\min} = -5.0$pu and $E_{FD\,\max} = 6.0$pu.
- MB-PSS: $V_{L\,\max} = -V_{L\,\min} = 0.075$pu, $V_{I\,\max} = -V_{I\,\min} = 0.60$pu, $V_{H\,\max} = -V_{H\,\min} = 0.60$pu, and $V_{ST\,\max} = -V_{ST\,\min} = 0.15$pu.

Table 3: Generator Data

| Gen | $X_d$ | $X_q$ | $X_q^{'}$ | $H$ | $D$ | $T_{d0}^{'}$ | $K_A$ | $T_A$ |
|---|---|---|---|---|---|---|---|---|
| 01 | 0.044737 | 0.036842 | 0.0157890 | 85.50 | 0 | 5.0 | 30 | 0.05 |
| 02 | 0.060714 | 0.050000 | 0.0214290 | 63.00 | 0 | 5.0 | 30 | 0.05 |
| 03 | 0.045267 | 0.035494 | 0.0154320 | 87.48 | 0 | 5.0 | 30 | 0.05 |
| 04 | 0.013569 | 0.010252 | 0.0045228 | 336.29 | 0 | 7.6 | 30 | 0.05 |
| 07 | 0.016667 | 0.011667 | 0.0050000 | 300.00 | 0 | 8.0 | 30 | 0.05 |

Table 4: Controller parameter boundaries [4]

| Parameter | min | max |
|---|---|---|
| $F_L$ (Hz) | 0.01 | 0.1 |
| $F_I$ (Hz) | 0.10 | 1.0 |
| $F_H$ (Hz) | 1.00 | 10.0 |
| $K_L$ (pu) | 0.01 | 30 |
| $K_I$ (pu) | 0.01 | 40 |
| $K_H$ (pu) | 0.01 | 120 |
| $K_G$ (pu) | 0.01 | 20 |

## References


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