Relative Hz difference of PSDS - LTD $\left(\text{i.e. } \left|f_{PSDS}(t) - f_{LTD}(t)\right| \times 60\text{Hz}\right)$
$\Delta\omega = 1 - \omega$

$$\dot{\omega}_{sys} = \frac{1}{2H_{sys}}\left(\frac{P_{acc,sys}}{\omega_{sys}(t)} - D_{sys}\Delta\omega_{sys}(t)\right)$$

ACE Conventions: Positive ACE denotes over generation. B (the frequency bias) is negative.

$$\begin{aligned}\text{ACE}_{\text{tie line}} &= P_{gen} - P_{load} - P_{\text{sched interchange}}\\ \text{ACE}_{\text{frequency bias}} &= 10B(f_{\text{actual}} - f_{\text{sched}})f_{base}\\ \text{ACE} &= \text{ACE}_{\text{tie line}} - \text{ACE}_{\text{frequency bias}}\end{aligned}$$

One way to think of deviation plots is $\text{LTD}_{data} + \text{Deviation}_{data} = \text{PSDS}_{data}$.
(Assuming all time step issues are handled appropriately.)

$$\%_{diff} = \frac{|x-y|}{\frac{x+y}{2}} * 100\%$$

Distribution of accelerating power based on inertia:

$$P_{e,i}(t) = P_{e,i}(t-1) - \Delta P_{acc,sys}(t)\frac{H_i}{H_{sys}}$$

The theoretical steady state frequency was calculated as

$$f_{ss} = f_{ref} + \Delta f = f_{ref} + \frac{\Delta P}{S_{base}\beta} \tag{1}$$

When R is a Pu value, β for N governor equipped machines is calculated as

$$\beta = \sum_{i=1}^{N} \frac{1}{R_i \frac{\text{S}_{\text{Base}}}{\text{M}_{\text{Base}_i}}} \tag{2}$$

Additionally, in a system with N generators, the weighted system frequency, f_w, is calculated as

$$f_w \text{ Pu} = \sum_{i=1}^{N} \frac{f_i}{f_{\text{Base}}} \frac{H_i \text{M}_{\text{Base}_i}}{\text{H}_{\text{sys}}} \tag{3}$$

$$\text{where } \text{H}_{\text{sys}} = \sum_{i=1}^{N} H_i \text{M}_{\text{Base}_i} \tag{4}$$