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Towards faster than real time simulations for control room applications

IEEE 2021 International Conference on Smart Grid Synchronized Measurements and Analytics – SGSMA 2021, May 25th - 27th 2021

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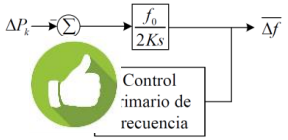
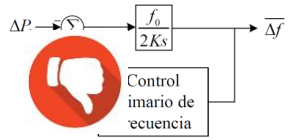
Faster than real time simulations

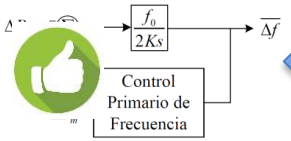
Simulator



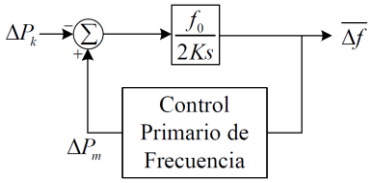
Scenario 1



Scenario 2



Scenario "n"

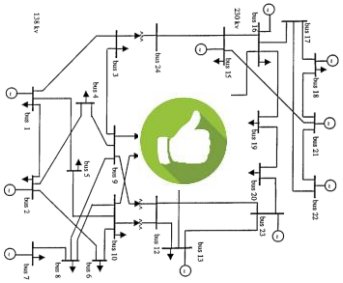


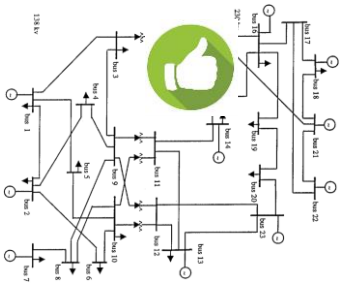
Model (simple)

Simulated system at time $t + k$

Simulation time $k >> \varepsilon$

Simulated system at time t





Actual system at time $t + \varepsilon$

Real time $\varepsilon << k$

Actual system at time t

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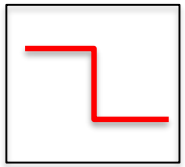
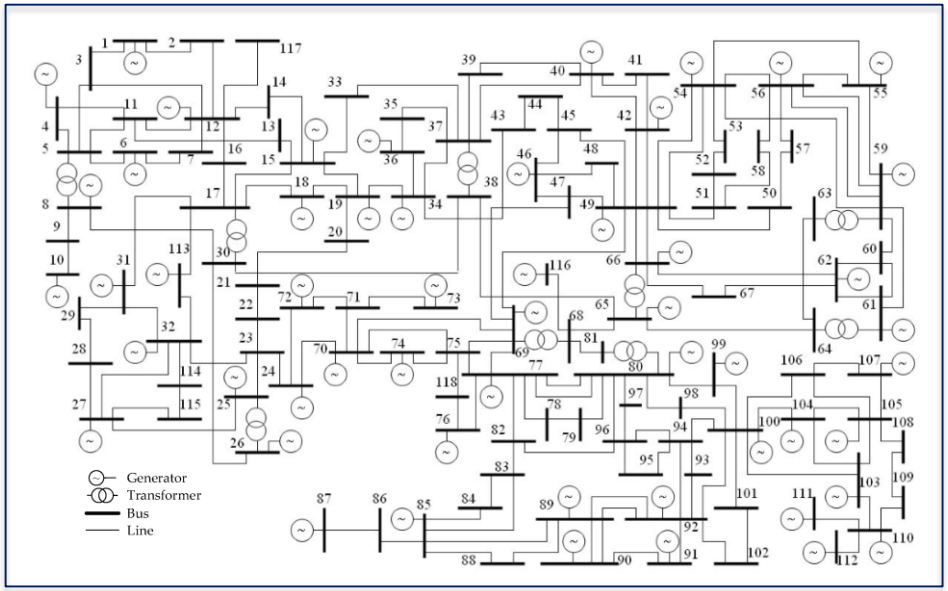
Need a Model

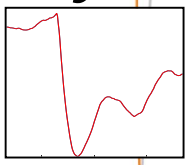
u



ΔP



y



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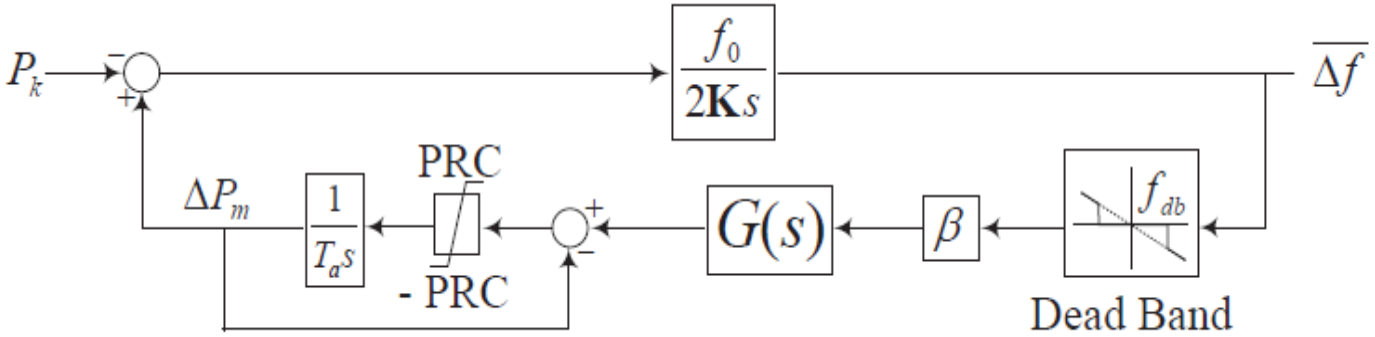

J. Quiroz and H. Chavez, "Towards On-line PMU-based Model Calibration for Look-ahead Frequency Analysis," *2019 IEEE Milan PowerTech*, 2019, pp. 1-5, doi: 10.1109/PTC.2019.8810759.

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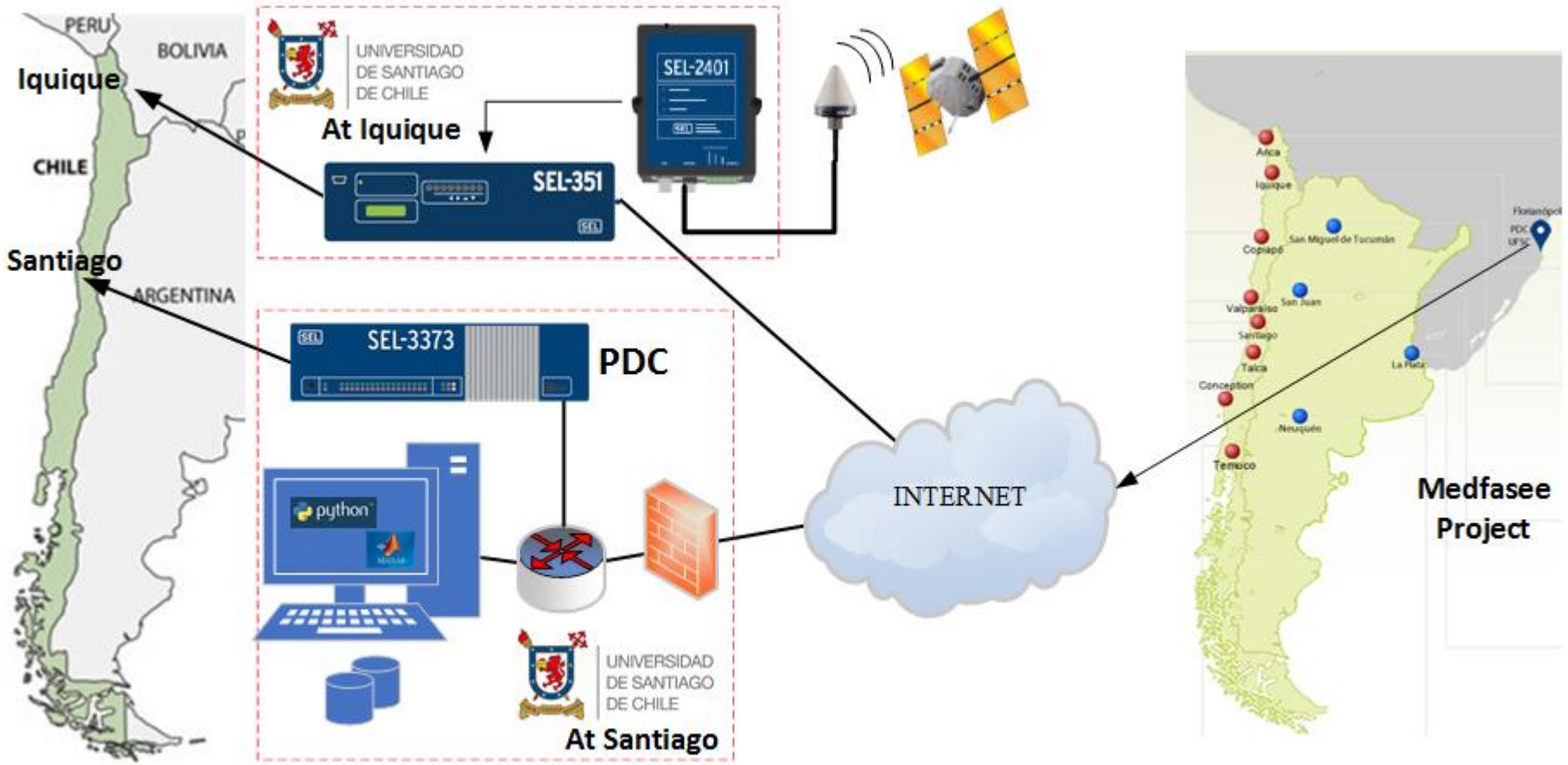
Current development



J. Quiroz, H. Chavez, J. Matevosyan, and F. Segundo, “A Hardware Implementation of an Online Frequency Dynamic Parameter Estimation," *2021 IEEE Madrid PowerTech*, 2021, pp. 1-5.

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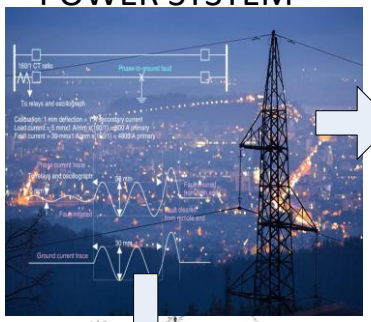
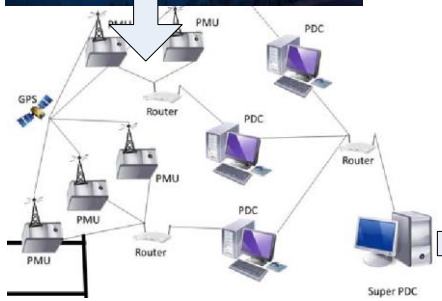
Current project

POWER SYSTEM



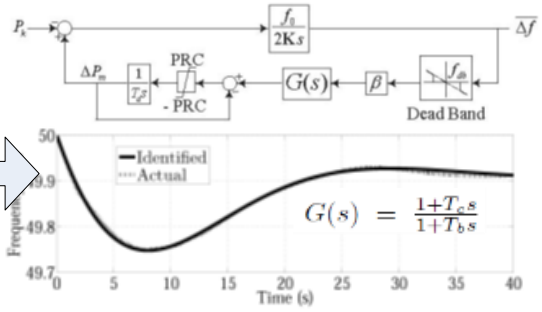
- Large load schedules
- Generator day-ahead states
- Distribution load forecasts
- Generators day-ahead AS

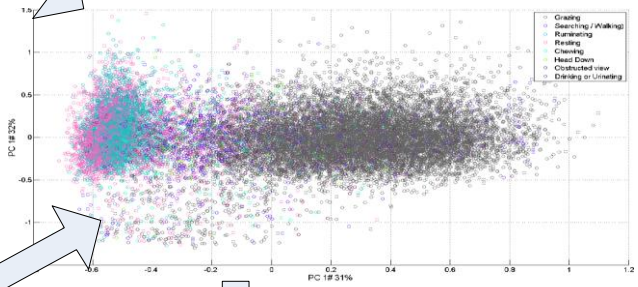
SCADA SYSTEM



PMU NETWORK

PARAMETER IDENTIFICATION PROCESS





$$K = f_k(x_1, x_2, \dots, x_k)$$
$$\beta = f_\beta(x_1, x_2, \dots, x_\beta)$$
$$T_b = f_{T_b}(x_1, x_2, \dots, x_{T_b})$$
$$T_c = f_{T_c}(x_1, x_2, \dots, x_{T_c})$$

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