Electrical Grid Stability Simulated Data Data Set

Download: Data Folder, Data Set Description

Abstract: The local stability analysis of the 4-node star system (electricity producer is in the center) implementing Decentral Smart Grid Control concept.

Data Set Characteristics:	Multivariate	**Number of Instances:**	10000	**Area:**	Physical
Attribute Characteristics:	Real	**Number of Attributes:**	14	**Date Donated**	2018-11-16
Associated Tasks:	Classification, Regression	**Missing Values?**	N/A	**Number of Web Hits:**	54321

Source:

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-- Date: November, 2018

Data Set Information:

The analysis is performed for different sets of input values using the methodology similar to that described in [SchÃ¤fer, Benjamin, et al. 'Taming instabilities in power grid networks by decentralized control.' The European Physical Journal Special Topics 225.3 (2016): 569-582.]. Several input values are kept the same: averaging time: 2 s; coupling strength: 8 s^-2; damping: 0.1 s^-1

Attribute Information:

11 predictive attributes, 1 non-predictive(p1), 2 goal fields:
1. tau[x]: reaction time of participant (real from the range [0.5,10]s). Tau1 - the value for electricity producer.
2. p[x]: nominal power consumed(negative)/produced(positive)(real). For consumers from the range [-0.5,-2]s^-2; p1 = abs(p2 + p3 + p4)
3. g[x]: coefficient (gamma) proportional to price elasticity (real from the range [0.05,1]s^-1). g1 - the value for electricity producer.
4. stab: the maximal real part of the characteristic equation root (if positive - the system is linearly unstable)(real)
5. stabf: the stability label of the system (categorical: stable/unstable)

Relevant Papers:

Arzamasov, Vadim, Klemens BÃ¶hm, and Patrick Jochem. 'Towards Concise Models of Grid Stability.'

Communications, Control, and Computing Technologies for Smart Grids (SmartGridComm), 2018 IEEE International Conference on. IEEE, 2018
(Section V-A)

Citation Request:

We thank Dr. Benjamin SchÃ¤fer for helping us with the initial version of the code used for simulations.
