

# **International Stiction Data Base (ISDB)**

*Limited Trial Version (1.0)*

User's Manual

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## Introduction

This is an international database of industrial control loops (most of them suffering from stiction) from different fields. It was an outcome of a project initiated by *Mohieddine Jelali* during the writing of the book

M. Jelali, B. Huang (Eds.): *Detection and Diagnosis of Stiction in Control Loops: State of the Art and Advanced Methods*. Springer-Verlag London, 2010.

The data were provided by different international Colleagues (called *Stiction Group*) who have contributed to the book.

The Stiction Group has decided to publish the database to enable other researchers working on the field to test their own methods on industrial data.

## Installation

1. Copy the mat-file *isdb10.mat* to your directory.
2. Start MATLAB 7.5.0 (R2007b).
3. Load and use the data.

## Data Information

The data are stored in a structure *cdata* that contains substructures.

Each data set contains: comments; brief comments; type (0: self-regulating; 1: integrating); sampling period [s]; and the data: t (time) [s], SP (set point), PV (process variable), OP (controller output), and (only for some loops) Kc (proportional gain), Ti (integration time constant), en (normalised control error SP – PV).

**Example:** PV for the chemical loop no. 19: `pv = cdata.chemicals.loop19.PV`.

## Acknowledgements

The industrial data were provided by courtesy of: Ashish Singhal and Timothy Salsbury for loops BAS 1–8; Alexander Horch for loops CHEM 1–3 and PAP 1–10; Peter He and Joe Qin for loops CHEM 4–6; Biao Huang for loops CHEM 7–12; Nina Thornhill for loops CHEM 13–17 and CHEM 40–64; Claudio Scali for loops CHEM 18–28 and CHEM 32–39; Shoukat Choudhury and Sirish Shah for loops CHEM 29–31, PAP 11–13, POW 1–5 and MIN 1.

Some of the data sets first appeared in earlier papers. For instance:

Loop CHEM2 is Loop 3 from Thornhill, N.F., and Hägglund, T., 1997, Detection and diagnosis of oscillation in control loops, *Control Engineering Practice*, 5, 1343–1354.

Loop CHEM13–17 are from Thornhill, N.F. and Horch, A., 2007, Advances and new directions in plant-wide disturbance detection and diagnosis, *Control Engineering Practice*, 15, 1196–1206.

Loops CHEM 13–17 and CHEM 40–64 entered in Thornhill, N.F., Shah, S.L., Huang, B., and Vishnubhotla, A., 2002, Spectral principal component analysis of dynamic process data, *Control Engineering Practice*, 10, 833–846.

Their nonlinearity assessment was presented in Thornhill, N.F., 2005, Finding the source of nonlinearity in a process with plant-wide oscillation, *IEEE Transactions on Control System Technology*, 13, 434–443.

## **Hints for the User**

If you use the data, please refer to the above-mentioned book, its homepage, or the original source of the data sets. If you need any further information about the data sets, please contact the colleague(s) who provided the corresponding data.