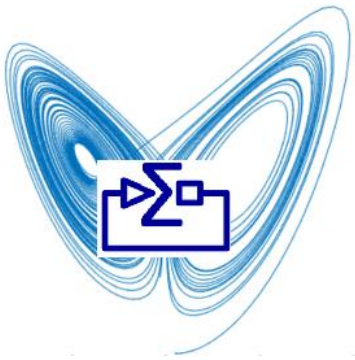
Process Control Briefings



Thanks to computer-based tools our pattern recognition ability has been greatly enhanced through data visualization. This type of image, allows us to validate, or at least view, cause-effect relationships.

As the saying goes, "a picture is worth a thousand words".

The pattern in Figure 1 shows Lorenz's atmospheric convection model. Lorenz's model is intended to predict the weather.

How often have you seen an accurate prediction of the weather?

A. Often
B. Rarely
C. Never

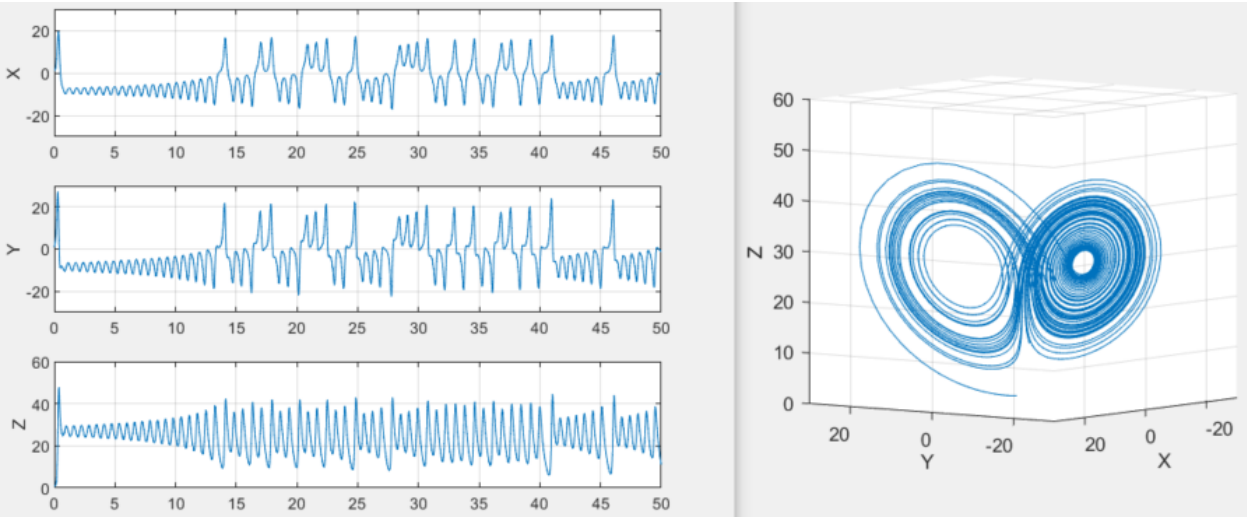


Figure 1 – Lorenz Attractor

What does this have to do with process control in the chemical processing industries? Frankly, very little, but stay with me. In the end, Lorenz's conclusion was that knowing the equations that govern a nonlinear dynamical system does not guarantee the ability to predict its future behavior. When controlling a process, even though the types and origins of disturbances are mostly unknown, there are handles, called manipulated variables, that can be used in feedback loops to steer the variables of interest to desired values, called setpoints.

In process control, we have been using models to describe chemical process dynamics. Here are some of the things I have learned in my 35+ years of working in process control:

1. Correlation does not mean causation
2. A model is a model - Reality tends not to behave like models predict
3. "All models are wrong, but some are useful" – G. Box

Modelling tools have enhanced our abilities to extract useful information and even produce models that can be used for control purposes, but it is only one of the dimensions of process control that has allowed me to solve many plant floor problems.

Combining some of the useful models with engineering fundamentals and control theory, has resulted in energy savings, increased yield and reduced production costs.

If you want to know more about how to get these kinds of results, I am writing a set of seven Process Control Briefings: "What is process control, and why you should care".

These briefings have been written to bring value to anybody interested in the technology, from engineers and automation professionals, to plant and production managers in the plants around the world in the chemical processing industries who are facing similar challenges, or rather… opportunities.

For the next 7 Tuesdays, starting today, follow me to learn more.