**Calculate the predicted offset of a non-integrable system**

Determine the offset from a step in setpoint from 23oC to 60oC using the FOPDT model:

**Solution**

At steady state:

* does not matter anymore
* The left-hand-side is zero

The deviation variable is:

Where:

The deviation variable is:

Note: The term is a constant that is typically set to the value of Q(t) when the controller is first switched from manual to automatic mode.

Where

The offset is 60 – T:

From previous fitting of the FOPDT model to the data, the found parameters are:

* Kp = 0.682
* θp = 22.517
* τp = 147.268

To obtain Kc:

Finally, the offset:

And the real offset from experimentation: