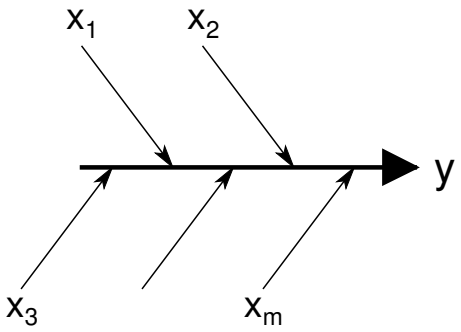
REPETITION VS REPLICATION

Principle: Suppose we are measuring a variable y. This variable y is affected by several other independent variables x_1, x_2, x_3 … x_m, which we are unable to control exactly.



If we take several measurements of the variable y, without disturbing the independent variables x_1, x_2, x_3 … x_m, this is pure repetition of the variable y. If we disturb and reset *all* the variables x_1, x_2, x_3 … x_m, to their original nominal values and for each complete resetting take measurements of y this is a full or true replication of y. If only a few of the variables x_1, x_2, x_3 … x_m, are reset or disturbed, we can call this a partial replication of y.

Procedure:

1. Take n repeated readings of the measured variable y and calculate the standard of these readings, $s_{repetition}$.
2. Take n replicated readings of the measured variable y and calculate the standard uncertainty of these readings, $s_{replication}$. Each time, all the independent variables should be reset to the same nominal values.
3. Compare $s_{repetition}$ with $s_{replication}$ and discuss the reasons for the result.