*Week-04-L-04*

# Select a Statistical Model

## Regression Model types and Uses

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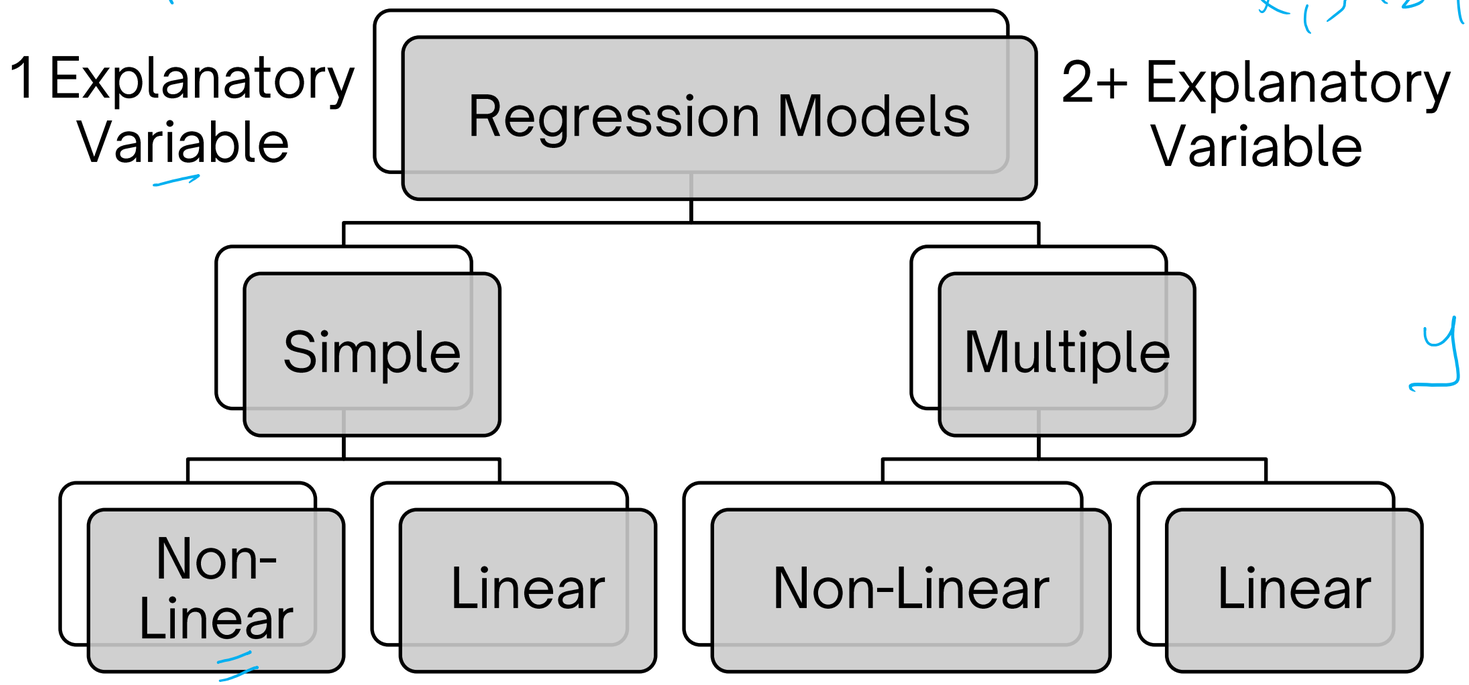
# Regression Models
## - types of

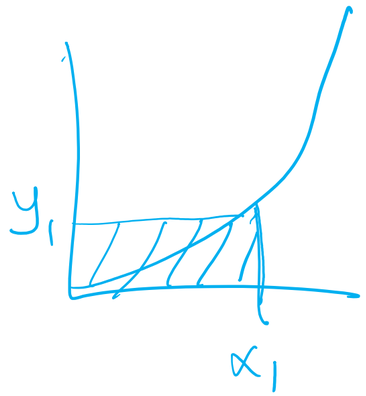

# Regression Models - types of

- Regression models that involve one explanatory variable are called simple regressions.

$y = mx + C$

- When one or more explanatory variables are involved, the relationships are called multiple regressions.

yield $\leftarrow y = ax_1 + bx_2 + C$ → water, → fertilizer




- Regression models are also divided into linear and nonlinear models.

- This division depends on whether the relationship between the response and explanatory variables is linear or nonlinear.

# Steps in Regression Modelling

1. Hypothesize deterministic component
2. Estimate unknown model parameters
3. Specify probability distribution of random error term
4. Estimate standard deviation of error
5. Evaluate model
6. Use model for prediction and estimation

$\sigma = \mu \pm \sigma$

$= 30 \pm 2$

$y = mx + c$

# Uses of Models

Simple regression models:

- These models can be used to capture important relationships between the forecast variable of interest and the predictor variables.
- A major challenge however, is that in order to generate future forecasts, the model requires future values of each predictor.

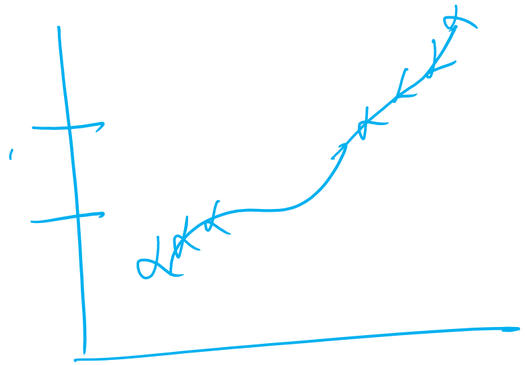
Multiple regression models:

- These can be used to analyze the relationship between a single dependent variable and several independent variables.
- The objective of multiple regression analysis is to use the independent variables whose values are known to predict the value of the single dependent value.

# Uses of Regression Models

# - in general

- Making forecasts/predictions estimates for Y
- Investigation of functional relationship between Y and Xi
- Filling-in missing data in Y-series
- Validation of Y-series



# Uses of Regression Models

## - in data processing

- Validation and in-filling of missing data using a reason curve and of discharges using RR-relation (such as in case of Logistic regression)
- Transformation of water levels to discharges using a power type regression equation
- Estimation of rainfall/climatic variable on a catchment grid like in continuous special field

# Thank you