

Chapter 10: Analysis of Variance (ANOVA) — Introduction

In Chapter 9 we considered two related populations X & Y .

↳ Now we will generalize to many populations

$X^{(1)}, X^{(2)}, X^{(3)}, \dots, X^{(k)}$
↑ old X ↑ old Y

Fancy viewpoint:

We have one giant population X , which we divide into "blocks" (like in §9.3) according to some "factor"

$X^{(1)}$ = block for first factor value

$X^{(2)}$ = block for second factor value

etc.

Example: X = lifespan of car

Let the "factor" be "type of car"

[$X^{(1)}$ = lifespan of sports car
 $X^{(2)}$ = lifespan of truck etc...
 $X^{(3)}$ = lifespan of van]

Chapter 10 is "single factor" ANOVA

(sometimes called "one-way" or "single classification")

Chapter 11 (which we will skip) is "multi-factor"

Another version (not in our textbook) is "multi-variate" ANOVA → "MANOVA"

In MANOVA multiple measurements are split into blocks according to factors

$X^{(1)}$ $Y^{(1)}$ ← blocks for 1st factor val.
 $X^{(2)}$ $Y^{(2)}$ ← blocks for 2nd factor val.
 $X^{(3)}$ $Y^{(3)}$ ← blocks for 3rd factor val.
⋮ ⋮

Example: X = lifespan of car

single factor: "type of car"

multi-factor: "type of car" & "color of car"

↑ "Red sports cars probably have short lifetime."

MANOVA: Y = mileage at first breakdown