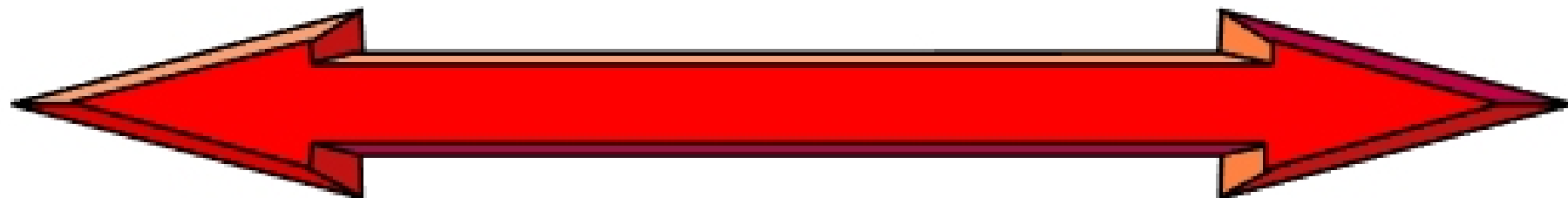


Statistical Techniques I

EXST7005

Linear Combinations



Linear combinations

- This is a function of random variables of the form $\sum a_i Y_i$ where a_i is a constant and Y_i is a variable.
- Generic Example: We want to create a score we can use to evaluate students applying to LSU as freshmen.
- $\text{Score} = a(\text{VerbalSAT}) + b(\text{MathSAT}) + c(\text{GPA})$
- where a , b and c are the constants and
- VerbalSAT, MathSAT and GPA are the variables (they vary among students).

Linear combinations (*continued*)

- **Score = $a(\text{VerbalSAT}) + b(\text{MathSAT}) + c(\text{GPA})$**
 - ➔ **we need to choose values of a , b and c**
 - **if $a = 1/3$ and $b = 1/3$ and $c = 1/3$ then we have an average $(a+b+c)/3$.**
 - **If $a = 1$ and $b = 1$ and $c = 1$ we have a simple sum $(a+b+c)$.**
 - **But VerbalSAT and MathSAT are values in the hundreds and GPA is around 2 or 3. So we might choose $a = b = 1/100$ and $c = 1$.**
 - **Any of these is a linear combination.**