each object described
by p variables

x_1 x_2 x_j x_p

1
2
i
n
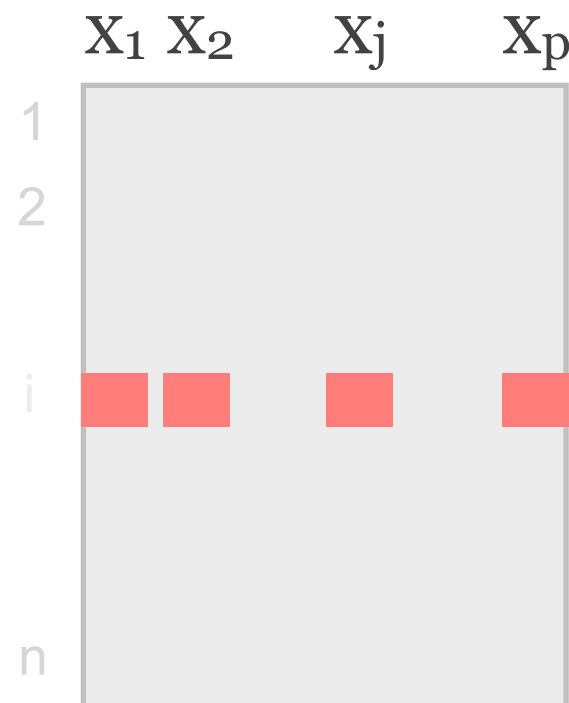
Associated
p-dimensional space

var p

i-th obs

var 1

var j