

## Stat 531/ Bivariate Data from Ghare and Torgeson

$x_1$  = time delay between detonation and explosion ( $10^{-2}$  sec)

$x_2$  = explosive force generated (ft lbs)

| Sample | Item | $x_1$ | $x_2$ | Sample Mean Vector                               | Sample Covariance Matrix   |
|--------|------|-------|-------|--|--|
| 1      | 1    | 332   | 253   | $\begin{pmatrix} 318.33 \\ 240.33 \end{pmatrix}$ | $\begin{pmatrix} 152.33 & 143.83 \\ 143.83 & 136.33 \end{pmatrix}$ |
|        | 2    | 308   | 230   |  |  |
|        | 3    | 315   | 238   |  |  |
| 2      | 1    | 335   | 242   | $\begin{pmatrix} 330.67 \\ 245.67 \end{pmatrix}$ | $\begin{pmatrix} 520.33 & 561.83 \\ 561.83 & 660.33 \end{pmatrix}$ |
|        | 2    | 351   | 273   |  |  |
|        | 3    | 306   | 222   |  |  |
| 3      | 1    | 355   | 267   | $\begin{pmatrix} 354.00 \\ 273.00 \end{pmatrix}$ | $\begin{pmatrix} 421.00 & 364.50 \\ 364.50 & 351.00 \end{pmatrix}$ |
|        | 2    | 374   | 294   |  |  |
|        | 3    | 333   | 258   |  |  |
| 4      | 1    | 323   | 238   | $\begin{pmatrix} 336.00 \\ 253.33 \end{pmatrix}$ | $\begin{pmatrix} 133.00 & 127.00 \\ 127.00 & 257.33 \end{pmatrix}$ |
|        | 2    | 340   | 270   |  |  |
|        | 3    | 345   | 252   |  |  |
| 5      | 1    | 350   | 260   | $\begin{pmatrix} 336.67 \\ 249.33 \end{pmatrix}$ | $\begin{pmatrix} 358.33 & 346.67 \\ 346.67 & 341.33 \end{pmatrix}$ |
|        | 2    | 315   | 228   |  |  |
|        | 3    | 345   | 260   |  |  |
| 6      | 1    | 349   | 268   | $\begin{pmatrix} 343.67 \\ 259.00 \end{pmatrix}$ | $\begin{pmatrix} 22.33 & 44.50 \\ 44.50 & 133.00 \end{pmatrix}$    |
|        | 2    | 340   | 246   |  |  |
|        | 3    | 342   | 263   |  |  |
| 7      | 1    | 330   | 246   | $\begin{pmatrix} 351.00 \\ 265.33 \end{pmatrix}$ | $\begin{pmatrix} 330.00 & 319.50 \\ 319.50 & 380.33 \end{pmatrix}$ |
|        | 2    | 363   | 285   |  |  |
|        | 3    | 360   | 265   |  |  |
| 8      | 1    | 340   | 255   | $\begin{pmatrix} 342.67 \\ 255.67 \end{pmatrix}$ | $\begin{pmatrix} 366.33 & 419.33 \\ 419.33 & 484.33 \end{pmatrix}$ |
|        | 2    | 325   | 234   |  |  |
|        | 3    | 363   | 278   |  |  |
| 9      | 1    | 355   | 282   | $\begin{pmatrix} 358.33 \\ 269.33 \end{pmatrix}$ | $\begin{pmatrix} 57.33 & 38.33 \\ 38.33 & 220.33 \end{pmatrix}$    |
|        | 2    | 367   | 273   |  |  |
|        | 3    | 353   | 253   |  |  |
| 10     | 1    | 367   | 283   | $\begin{pmatrix} 342.33 \\ 261.33 \end{pmatrix}$ | $\begin{pmatrix} 505.33 & 439.33 \\ 439.33 & 382.33 \end{pmatrix}$ |
|        | 2    | 337   | 256   |  |  |
|        | 3    | 323   | 245   |  |  |

(Weighted) Average sample mean vector =  $\begin{pmatrix} 341.367 \\ 257.233 \end{pmatrix}$

(Weighted) Average sample variance-covariance matrix =  $\begin{pmatrix} 286.933 & 280.433 \\ 280.433 & 334.667 \end{pmatrix}$