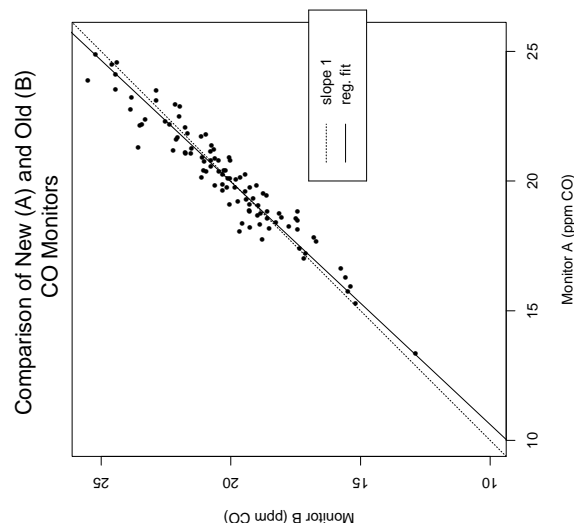


Calibration Example

- Two monitors measure indoor concentrations of carbon monoxide (CO) per minute in ppm.
- Monitor A is a newer, more accurate monitor. Monitor B is an older monitor.
- QA experiment: To verify that the monitors are measuring the same concentrations, both monitors are co-located near a CO source, and are turned on simultaneously.



```

Coefficients:
            Value Std. Error    t value Pr(>|t|)
(Intercept)  -1.3393    0.6516   -2.0553  0.0425
            A    1.0681    0.0322   33.1355  0.0000

Residual standard error: 0.6825 on 98 df
Multiple R-Squared:  0.9181
F-stat: 1098 on 1 and 98 df, p-value is 0

            Df Sum of Sq  Mean Sq  F Value Pr(F)
A            1  511.3960  511.3960 1097.962    0
Residuals  98  45.6453   0.4658

```

Simultaneous Inference

see Section 6.3 of *Sleuth*, Concept. Exc. 9

- CI for the regression line,

$$\hat{\mu}\{Y|X\} \pm \sqrt{2 \times F_{2,n-2}(.95)} \times SE[\hat{\mu}\{Y|X\}]$$
- 95% CI for β_0 and β_1 , such that the two CIs *simultaneously* capture the slope and intercept of the regression line with 95% probability. *Bonferroni procedure* $\hat{\beta}_1 \pm t_{n-2}(1 - \alpha/4) \times SE(\hat{\beta}_1)$
- Simultaneous estimation for g means of Y at a set of g X 's. *Bonferroni procedure*

$$\hat{\mu}\{Y|X\} \pm t_{n-2}(1 - \frac{\alpha}{2g}) SE(\hat{\mu}\{Y|X\})$$
- Simultaneous prediction intervals for new observations.
 Use Bonferroni multiplier or a more conservative Scheffe multiplier.