```
dat = classdata("fev2.dat");   dat$fev = 10*dat$fev
```

```
FEV:    Forced Expiratory Volume
HEIGHT: height in inches
AGE:    age in years
```

```
> anova(mod)
          Df   SumSq  MeanSq  Fvalue      Pr(>F)
HEIGHT     1 16444.7 16444.7 807.959  < 2.2e-16
AGE        1   582.4   582.4  28.615  1.429e-07
Residuals 436  8874.1    20.4
```

```
> mod <- lm(FEV~HEIGHT+AGE, data=dat)
> summary(mod)
             Estimate Std.Error  t value Pr(>|t|)
(Intercept) -63.329    3.56778 -17.750  < 2e-16
HEIGHT        1.353    0.06369  21.239  < 2e-16
AGE           0.605    0.11304   5.349 1.43e-07
---
Residual std error: 4.511 on 436 degrees of freedom
F-statistic: 418.3 on 2 and 436 DF,  p-value: < 2.2e-16
```

```
> vcov(mod)
              (Int)  HEIGHT     AGE
(Int)    12.729  -0.216   0.098
HEIGHT   -0.216   0.004  -0.004
AGE       0.098  -0.004   0.013
```

- Testing H_0: $\beta_1 = \beta_2 = 0$ vs. ~H_0
- Suppose we want to find the expected change in FEV for a simultaneous 1 inch decrease in height and 1 year increase in Age. → linear contrast: $L = -1*\beta_1 + \beta_2$
  We need to estimate L and its Standard Error, using the fact that

  $var(A+B) = var(A) + var(B) + 2*cov(A,B)$