

4.5: Residual Analysis

To check the validity of the assumptions used to develop our model, we can again apply the residual analysis techniques that we used to examine the one-factor model in Section 3.4.

This function call:

```
> plot(fitted(int00.lm), resid(int00.lm))
```

produces the plot shown in Figure 4.2. We see that the residuals appear to be somewhat uniformly scattered about zero. At least, we do not see any obvious patterns that lead us to think that the residuals are not well behaved. Consequently, this plot gives us no reason to believe that we have produced a poor model.

The Q-Q plot in Figure 4.3 is generated using these commands:

```
> qqnorm(resid(int00.lm))  
> qqline(resid(int00.lm))
```

We see that the residuals roughly follow the indicated line. In this plot, we can see a bit more of a pattern and some obvious nonlinearities, leading us to be slightly more cautious about concluding that the residuals are

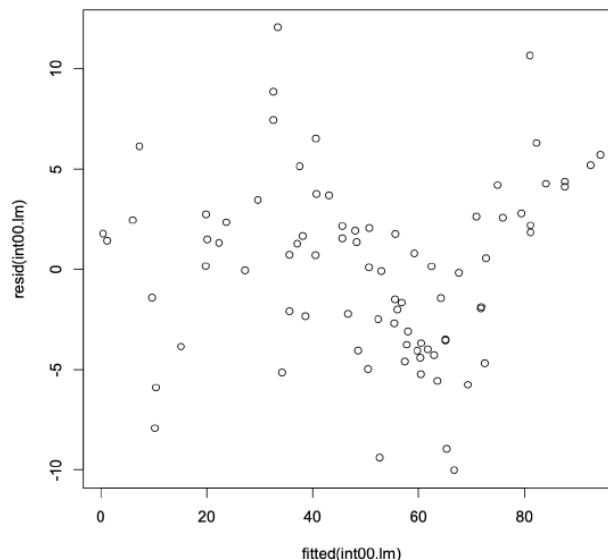


Figure 4.2: The fitted versus residual values for the multi-factor model developed from the Int2000 data.

normally distributed. We should not necessarily reject the model based on this one test, but the results should serve as a reminder that all models are imperfect.

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