Number of Children - Poisson Models with Polynomial Terms

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First of all, the children data is loaded:

```
> library(catdata)
> data(children)
> attach(children)
```

A log-linear Poission model with the number of children as dependent variable
is fitted. Since one cannot expect that the metric predictors have linear effects,
polynomial terms are included in the predictors.

```
> pois <- glm(child ~ age+I(age^2)+I(age^3)+I(age^4)+dur+I(dur^2)+nation+god+univ,
+            data = children,  family = poisson(link=log))
> summary(pois)
```

Visualizing the effect of age and duration for education.

```
> x <- min(age):max(age)
> y <- exp(pois$coef[1]+pois$coef["age"]*x+pois$coef["I(age^2)"]*x^2+
+   pois$coef["I(age^3)"]*x^3+pois$coef["I(age^4)"]*x^4+pois$coef["dur"]*10+
+   pois$coef["I(dur^2)"]*100)
> par(cex=1.4)
> plot(x, y, ylab="Number of Children", xlab="Age")

> y <- (pois$coef[1]+pois$coef["age"]*x+pois$coef["I(age^2)"]*x^2+
+   pois$coef["I(age^3)"]*x^3+pois$coef["I(age^4)"]*x^4+pois$coef["dur"]*10+
+   pois$coef["I(dur^2)"]*100)
> par(cex=1.4)
> plot(x, y, ylab="Linear Predictor", xlab="Age")

> x <- min(dur):max(dur)
> y <- exp(pois$coef[1]+pois$coef["age"]*40+pois$coef["I(age^2)"]*40^2+
+   pois$coef["I(age^3)"]*40^3+pois$coef["I(age^4)"]*40^4+pois$coef["dur"]*x+
+   pois$coef["I(dur^2)"]*x^2)
> par(cex=1.4)
> plot(x, y, ylab="Number of Children", xlab="Duration of School Education")

> y <- (pois$coef[1]+pois$coef["age"]*40+pois$coef["I(age^2)"]*40^2+
+   pois$coef["I(age^3)"]*40^3+pois$coef["I(age^4)"]*40^4+pois$coef["dur"]*x+
+   pois$coef["I(dur^2)"]*x^2)
> par(cex=1.4)
> plot(x, y, ylab="Linear Predictor", xlab="Duration of School Education")
```

Calculate the deviance of the Poisson model.

```
> anova(pois)
```