

# Introduction to Linear Regression using QR Decomposition

## Overview

The `AdvanceAssignment4` package implements linear regression using QR decomposition method. This vignette describes how to use the `linreg` function with the `iris` dataset to fit a linear regression model, inspect outputs, and generate diagnostic plots.

## Fitting a Linear Regression Model

To fit a linear regression model using the `linreg` function, the `iris` dataset will be used.

```
library(AdvanceAssignment4)

# Fit the model
model <- linreg(Petal.Length ~ Species, data = iris)
```

## Accessing Model Coefficients

You can access the model coefficients using the `coef()` method:

```
# Coefficients
model$coef()
#> Coefficients:
#>      (Intercept) Speciesversicolor Speciesvirginica
#>           1.462           2.798           4.090
```

## Making Predictions

To obtain predictions from the model, use the `pred()` method:

```
# Predictions
predictions <- model$pred()
head(predictions)
#> [1] 1.462 1.462 1.462 1.462 1.462 1.462
```

## Residuals

The residuals of the model can be accessed using the `resid()` method:

```
# Residuals
residuals <- model$resid()
head(residuals)
#> [1] -0.062 -0.062 -0.162  0.038 -0.062  0.238
```

## Model Summary

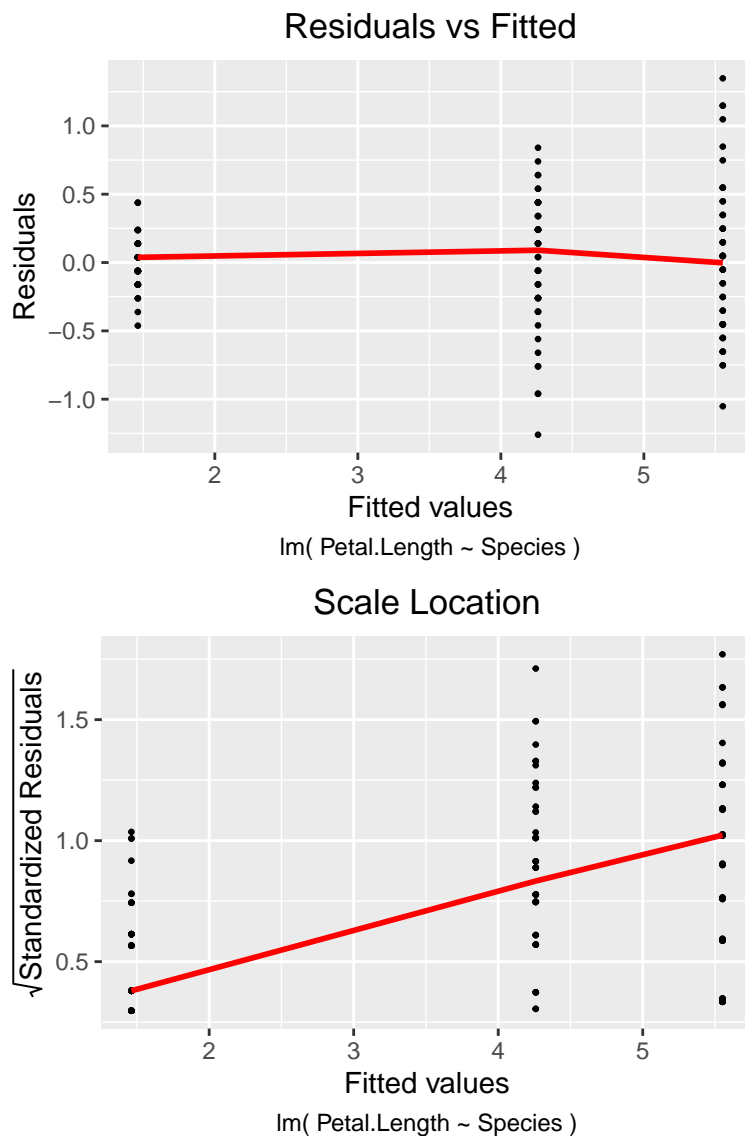
To get a summary of the model, use the `summary()` method:

```
# Model summary
model$summary()
#> Coefficients Std.Error t-value p-value
#> (Intercept) 1.462 0.06085848 24.02294 0 ***
#> Speciesversicolor 2.798 0.08606689 32.5096 0 ***
#> Speciesvirginica 4.09 0.08606689 47.52118 0 ***
#> Residual standard error: 0.4303345 on 147 degrees of freedom
```

## Generating Diagnostic Plots

To visualize model diagnostics, use the `plot()` method:

```
# Diagnostic plots
model$plot()
```



This vignette offers a detailed guide on how to utilize the `linreg` function with the iris dataset, showcasing the comprehensive features of the `AdvanceRAssignment4` package.