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Qmbu450 : Advanced Data Analysis in Python

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### Football Players' Age and Their Market Values

Hypothesis : There is a strong relationship between age and market values among the best players in the world

To test this hypothesis transfermarkt.com's ranking of best players in the world is used:

<https://www.transfermarkt.com/spieler-statistik/wertvollstespieler/marktwertetop>

A linear regression function is created from the scratch by using the formulas:

$$\begin{aligned}\hat{\beta} &= (X'X)^{-1}X'y, \\ \text{Var}(\hat{\beta}) &= \sigma^2(X'X)^{-1}, \\ \sigma^2 &= \frac{e'e}{n - k - 1}, \\ e &= y - \hat{y}, \\ y &= X\beta + e.\end{aligned}$$

The result is :

Betas:

```
[[96.17737473]
 [ 0.84076237]]
```

Std. Errors:

```
[[106.7102344 ]
 [  4.15482353]]
```

Confidence Intervals 95 %:

```
[[ -112.97468469  305.32943416]
 [  -7.30269174    8.98421649]]
```

Result:

Hypothesis is rejected. There is a strong positive relationship between age and market value. Higher the age, higher the market value for this sample.