Assume data.csv is the observed data in form of input-output pair. Please use the family of exponential function, with , for the regression analysis and find the optimal coefficients, and . You may use JavaScript, python, or other language to solve this problem. In addition, compare the difference of estimation error for linear regression and exponential regression.

let x=[0,1,2,3,4,5,6,7,8,9,10]

let y=[9735,4597,2176,1024,483,229,108,52,24,11,6]

**線性回歸結果：**

**截距 (alpha): 5120.636**

**斜率 (beta): -688.764**

**相關性 (correlation): -0.757**

線性回歸主要用於測量因變數(Y)與一或多個自變數(Y)之間的線性關係，而在線性回歸中假設X和Y之間的線性關係存在，表示為y=α+βx。其中α 為截距，β 為斜率。目標是找出最佳的直線，使得這條直線與觀察到的數據點之間的誤差最小。

相關係數越接近1表示正向線性相關性越強，相關係數越接近-1表示負向線性相關性越強。而**此線性回歸結果中的相關係數為-0.757**，可以說明X和Y之間有負相關性，程度為中度強度，但沒有到十分強烈。

**指數回歸結果：**

**係數 (a): 9620.329**

**指數 (b): -0.746**

**相關性：-0.99999**

不同於線性回歸，指數回歸中假設因變數Y與自變數X之間的關係式指數形式，表示為指數函數其中其中α 和 β 是回歸參數，且β<0。

**linear regression**

0 9735 linearexponential regression.js:12

1 4597 linearexponential regression.js:12

2 2176 linearexponential regression.js:12

3 1024 linearexponential regression.js:12

4 483 linearexponential regression.js:12

5 229 linearexponential regression.js:12

6 108 linearexponential regression.js:12

7 52 linearexponential regression.js:12

8 24 linearexponential regression.js:12

9 11 linearexponential regression.js:12

10 6 linearexponential regression.js:12

alpha 5120.636363636364 beta -688.7636363636364

linearexponential regression.js:14

correlation is -0.757019814984881

**exponential regression.**

a 9620.329408784626 b -0.7461780351670065 linearexponential regression.js:30

a 9620.329408784626 b -0.7461780351670065 linearexponential regression.js:21

0 9620.329408784626 linearexponential regression.js:22

1 4561.723310041821 linearexponential regression.js:22

2 2163.056863559917 linearexponential regression.js:22

3 1025.6683005508223linearexponential regression.js:22

4 486.34665157320825 linearexponential regression.js:22

5 230.61360614288708 linearexponential regression.js:22

6 109.35129329295124 linearexponential regression.js:22

7 51.85169056084271 linearexponential regression.js:22

8 24.586794843062844 linearexponential regression.js:22

9 11.658452677555992 linearexponential regression.js:22

10 5.528151176368649 linearexponential regression.js:22