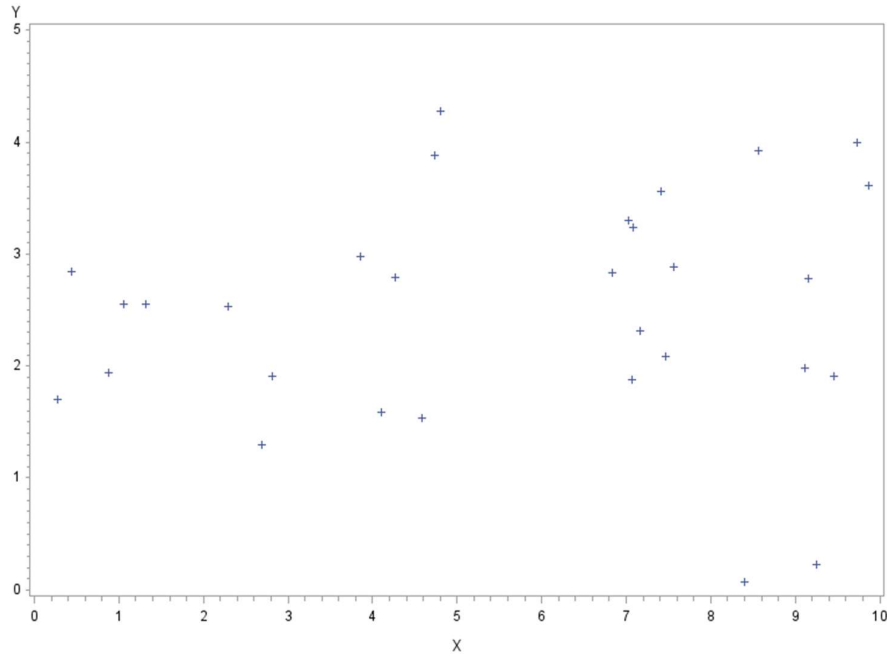


HW 6 Report

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I Calculation for initial values of parameters

Figure 1: Y vs. X



From the figure 1, we can see a slight upward trend though it is not that significant. However, our guess for the initial values of the parameters can only be based on this plot. From the data and model, we can guess the reasonable initial values: For parameter a , when X is close to 0, a is close to Y . Then from the data, the guess for the initial value of a is 1.700145599; For the parameter b , when X is close to infinity, b is close to $Y-a$. Then from the data, the guess for the initial values of b is 1.91341015; For the parameter c , when $X=1$, c is close to $b/(y-a)-1$. Then from the data, the guess for the initial values of c is 1.2499623327.

II The estimated parameters

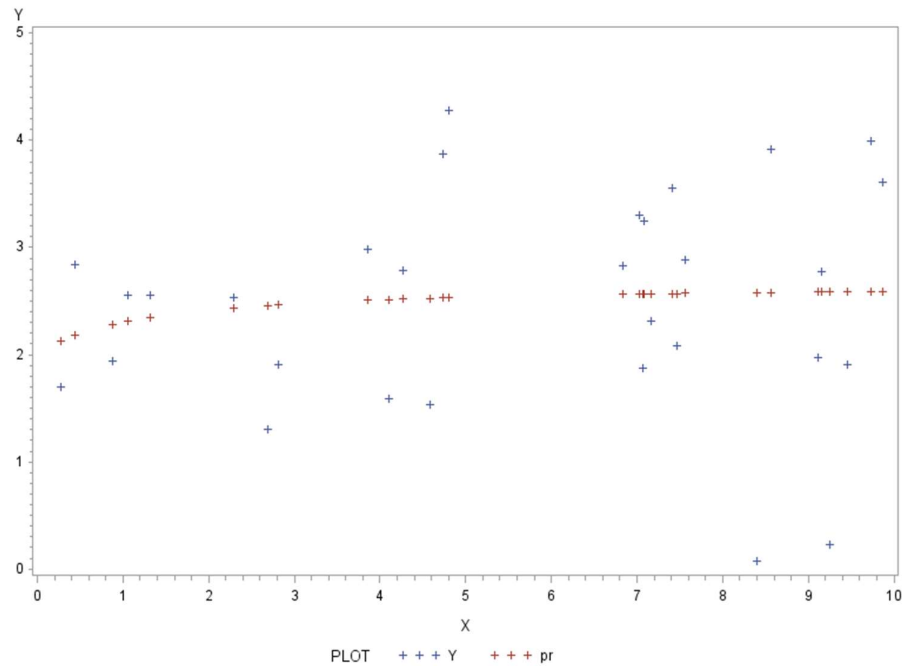
Table 1: Estimated parameters

Parameter	Estimate	Approx Std Error	Approx 95% Confidence Limits	
a	1.9955	1.8225	-1.7439	5.7350
b	0.6650	1.4762	-2.3639	3.6939
c	1.1754	9.8744	-19.0851	21.4360

The estimated parameters are shown as above. The estimate of parameter a is 1.9955, with b as 0.6650 and c being 1.1754.

III Make a figure combining two plots

Figure 2: Combination of two plots



The combination plot is shown above. From the plot we can see fitted Y (in red plus sign) is not that matched with observed Y (in blue plus sign).

IV Model fitting

Table 2: Model fitting

Source	DF	Sum of squares	Mean Square	F Value	Pr > F
Model	2	0.4576	0.2288	0.21	0.8147
Error	27	29.9176	1.1081		
Corrected Total	29	30.3752			

From the table 2, we can see the p-value for the model is 0.8147, which is greater than 0.05, indicating that this model is not significant to explain the variation of Y based on X. Besides, we can also see the less fitting in the figure 2. Therefore, this model does not fit the data well.

Appendix

```
proc import datafile = 'E:/GW/Textbook/Data Analysis/HW6/HW6.csv' /*read the file into
sas*/
dbms = csv /*specify the format of the file*/
out=work.HW6; /*specify the saved dataset in sas*/
getnames=yes; /*get the name of the variables from the original file*/
run; /*run this procedure*/
/* See the trend of Y based on X */
proc gplot data=HW6;
  plot Y*X;
run;

/* Calculate the initial values of parameters */
DATA Para;
A = 1.700145599; /*When X is close to 0, a = y, which in the data is 1.700145599*/
B = 3.613555741 - A; /*When X is close to inf, b = y -a, which in the data is 1.700145599 -
A*/
C = 1.91341015/(2.550564347-1.700145599)-1; /* c = b/(y-a)-1, which in the data is B /
(2.550564347-a) - 1 */
RUN;
proc print data=Para;
run;
/* Nonlinear regression */
proc nlin data=HW6;
  parms a=1.700145599 b=1.91341015 c=1.2499623327;
  model Y=a+b*X/(c+X);
  output out=nlout p=pr;
run;
/* Plot the combination plot*/
proc gplot data=nlout;
  plot (Y pr)*X/overlay legend;
  symbol1 i=none v=plus;
  symbol2 i=join v=none;
run;
```