Ay190 – Worksheet 6
Anthony Alvarez
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1 Linear Regression

1.1 Loading Data

After successfully loading the data into python we are able to plot it and examine its proporties. In figures 1 we can see that the data is fairly linear and therefore will be fit by a line fairly well.

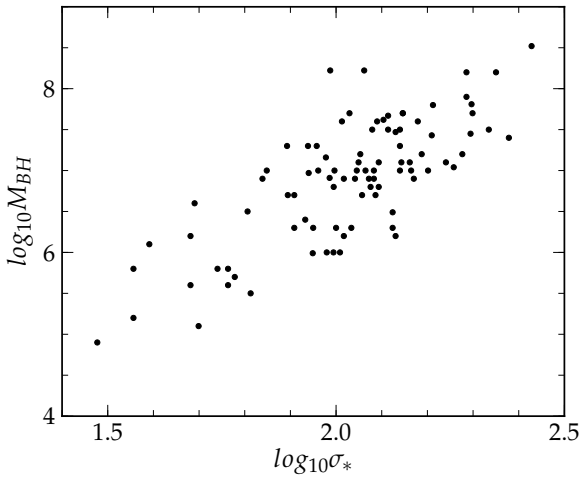

Figure 1: Data loaded from the Ay190 website

1.2 Linear Regression - Ignoring Errors

When doing a simple linear regression we simply take the least squares estimator for the slope and for the intercept. We found in figure 2 that our line bisects the data nicely. It also appears that the errors are evenly or even normally distributed which is again a good indicator of a good fit.

1.3 Linear Regreession - Including Errors

When we add the error terms I chose to add the formal errors. We note that our fit doesn't change too much but now the parameters of the fit have error. So by taking the linear regression and $\pm\sigma$ in both intercept and slope gives us a sense of how confident we are in the initial fit. This gives us a more intuitive visual way of thinking about uncertanty in fits.

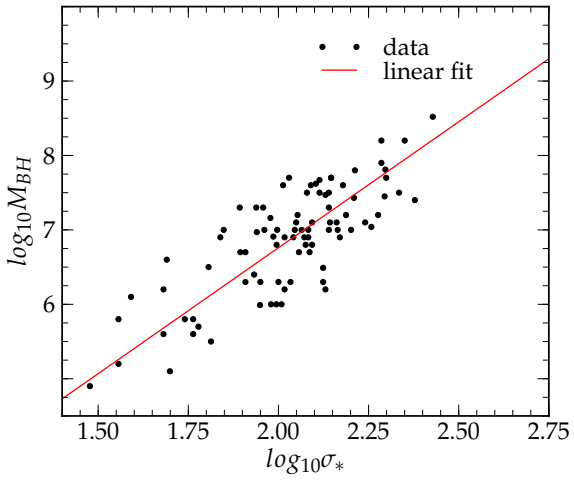

Figure 2: We have succesfully implemented a linear fitter.

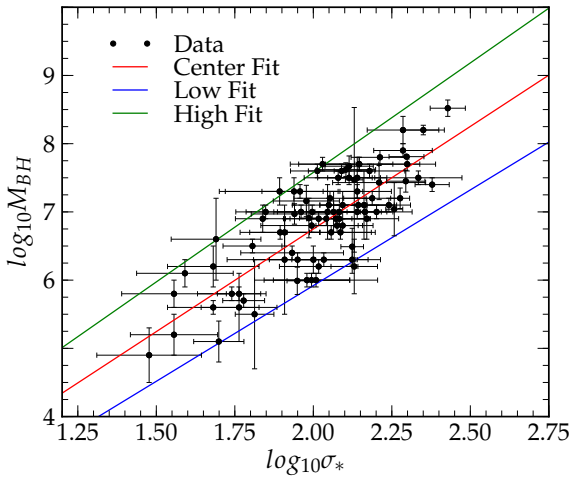

Figure 3: Displays the $\pm\sigma_m$& $\pm\ \sigma_b$ linear fits.