1. G13.1
2. G13.2
3. MGB X.15

On our course’s web page you will find a Gauss data set inside a zip file which you may download. It contains information on the duration of time spent searching for the first job taken after the completion of education (given that a positive amount of time was spent searching) and the wage that was eventually accepted. The data are extracted from the National Longitudinal Survey of Youth, 1979 Cohort. The duration measure (in weeks) is the first variable and the wage is the second (before conducting the analysis, convert duration from weeks to months by dividing by 4.33). There are 389 cases in the data set. All individuals in the sample had completed at least 12 years of schooling prior to entering the labor market “permanently.” Answer the following questions using these data.

4. The theory of search in a stationary environment implies the optimal job acceptance rule is to accept any wage greater than or equal to \( w^* \), where \( w^* \) is a function of the primitive parameters of the model. Using the wage data, find a consistent estimate of \( w^* \).

5. Assume that wage offers are exponentially distributed, that is, upon meeting a potential employer a wage offer is made to the searcher which is an i.i.d. draw from the c.d.f. \( F_W(w) = 1 - \exp(-\alpha w) \), for \( w > 0 \) and \( \alpha > 0 \). The data at your disposal are then a sample from a truncated exponential distribution with lower truncation point given by \( w^* \). [You can think of the truncated distribution simply as the conditional distribution of wages given that \( w \geq w^* \)]. Write down the log likelihood function for the sample of wage offers, and find the maximum likelihood estimator of \( \alpha \) given your consistent estimate of \( w^* \).
6. Search theory also implies that the distribution of search times should be exponential, so that $F_T(t) = 1 - \exp(-\lambda t)$, $\lambda > 0$ and $t > 0$. Using the sample of unemployment spell durations, find the maximum likelihood estimate of $\lambda$.

7. One test of the appropriateness of the search model is a test for whether unemployment durations are truly exponentially distributed. Consider the alternative assumption (Weibull) for the density of unemployment spell durations:

$$f_T(t) = abt^{b-1} \exp(-ax^b), \ a > 0, b > 0.$$ 

This reduces to the exponential density when $b = 1$. As a prelude to conducting a test of the hypothesis that $b = 1$, obtain maximum likelihood estimates of $a$ and $b$.

8. Another implication of basic search theory is that the wage offer eventually accepted is independent of the length of the unemployment spell. Estimate by ordinary least squares the regression function

$$w_i = \beta_0 + \beta_1 t_i + u_i,$$

where you can assume that $E(u_i|t_i) = 0$ and $E(u_i^2|t_i) = \sigma^2$ for all $i$. We will talk about conducting hypothesis tests using your estimates next week.