This note explains the usages of the matlab files developed for the unit root testing procedures in Kim and Perron, 2009, Unit Root Tests Allowing for a Break in the Trend Function at an Unknown Time Under Both the Null and Alternative Hypotheses, Journal of Econometrics 148, 1-13.

1 AO Models

1.1 Estimation of the break date

breakestimate.m yields the estimated break date $\hat{T}_1$ from a static regression. That is the sample size T times $\hat{\lambda}_1^{AO}$ defined around equation (5) of Kim and Perron (2009). This is in fact the same as the one given in Perron and Zhu (2005).

Dbreakestimate.m yields the estimated break date $\hat{T}_1$ from a dynamic regression. That is the sample size T times $\hat{\lambda}_2^{AO}$ defined around equation (6) of Kim and Perron (2009).

Both files can be used for Models A1, A2 and A3.

1.2 Choice of k

MIC.m chooses k, the number of the lags of the differences of the dependent variable for AO models based on the information criteria:

$$\tilde{y}_t = \hat{\alpha}\tilde{y}_{t-1} + \sum_{j=0}^{k} \hat{w}_j D(T_1)_{t-j} + \sum_{j=1}^{k} \hat{d}_j \Delta\tilde{y}_{t-j} + \hat{u}_t \quad \text{(Models } A1 \text{ and } A3\text{)}$$

$$\tilde{y}_t = \hat{\alpha}\tilde{y}_{t-1} + \sum_{j=1}^{k} \hat{d}_j \Delta\tilde{y}_{t-j} + \hat{u}_t \quad \text{(Model } A2\text{)}$$

Note that k is not the autoregressive order. $k+1$ is the autoregressive order. This file can be used for Models A1, A2 and A3 as well as the standard model that has only a constant and linear time trend. Also, the choice of k can be based on AIC, BIC, MAIC and MBIC.

1.3 Unit Root test

URdfk.m is for the standard ADF test without any break in the deterministic trend.

UR2k.m is for Model A2 and **UR3k.m** is for Model A3. The exact equation used in this file is given in equation (2) of Kim and Perron (2009), which is in fact the same as the Perron (1989) procedure.

URktrimming.m is for the unit root procedure with trimmed data. The exact procedure executed in this file is described in Section 4 of Kim and Perron (2009). Note that this file uses URdfk.m

and UR2k.m as a subroutine. Unless these two files are in the same folder, URktrimming.m may give an error.

All of these unit root test files yield the value of t-statistic. The relevant asymptotic critical values for Models A3 can be found in Perron (1989) Table IV.B and VI.B and for Model A2 from Perron and Vogelsang (1993) Table 1.

2 IO Models

2.1 Estimation of the break date

breakestimatek.m yields the estimated break date $\hat{T}_1$ from a static regression. That is the sample size T times $\hat{\lambda}^{IO}$ defined around equation (7) of Kim and Perron (2009). This file can be used for Models I1 and I3.

2.2 Choice of k

IC.m chooses the autoregressive order p. Note k the number of the lags of the differences of the dependent variable is $p-1$. This file can be used for Models I1 and I3 as well as the standard model that has only a constant and linear time trend. Also, the choice of p can be based on AIC and BIC.

2.3 Unit Root test

IR3k.m is for Model I3. The exact equation used in this file is given in equation (3) of Kim and Perron (2009), which is in fact the same as the Perron (1989) procedure. This file yields the value of t-statistic. The relevant asymptotic critical values can be found in Perron (1989) Table VI.B.