

Matlab protocols in paper 'How One Might Miss Early Warning Signals of Critical Transitions in Time Series Data: A Systematic Study of Two Major Currency Pairs:'

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Abstract

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Protocol

Use Matlab script (Text A in S1) to convert original data into fixed time intervals.

Step 1.

End product: *newM* (n-by-2 matrix)

Tunable parameters: *STL*, *TTL*

Use Matlab script (Text B) to apply Gaussian de-trending to *newM*.

Step 2.

End product: *Residue* (n-by-2 matrix)

Tunable parameters: *wid*

Find EWSs from AC(1), Var, and LFPS by Texts C, D, and E, respectively.

Step 3.

End product: *signal* (n-by-8 matrix)

Tunable parameters: *samplesize*, *window*, *R_window*, *R_step*, *incre*, *inner_incre*, *Threshold_Pvalue_ken*, *Threshold_Phist_end*

Apply criteria of historical P value of endpoints on EWSs such that only the ones with low enough historical P value are selected to be significant EWSs. (Text F)

Step 4.

End product: *signal*

Tunable parameters: *Phist*

Obtain concurrent EWSs using Text G

Step 5.

End product: *overlap_signal*

Tunable parameters: *Endpoint_Phist*

Compute DR and SP using Text H multiple times, each time for one EWS data file

Step 6.

End product:

Disc_rate_10pct_vshist (DR10)

Disc_rate_5pct_vshist (DR5)

Component_10pct_vssigs (SP10)

Component_5pct_vssigs (SP5)

Tunable parameters: the EWS data file, *DT_max*, *R_step*

Reliability analyses (Texts I and J)

Step 7.

End product: reliability analyses figures

Tunable parameters (Both I and J): *TI*, *TW*, *topxpct*, *Duration_EWS*, *P_kendall_max*, *P_endpoint_max*, *N_samples*, *R_step*, *Size_Sample_days*(Text J only)