

Progress notes:

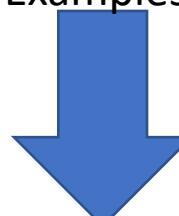
1. KPSS stationarity test using ‘trend=true’ and ‘trend=false’
2. Combining the results from KPSS test when ‘trend=true’ and ‘trend=false’
3. The ADF, PP and KPSS p-value results for all datasets:

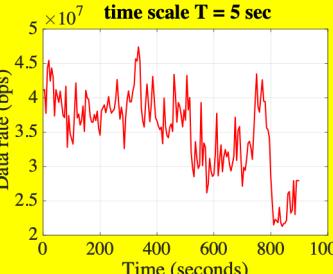
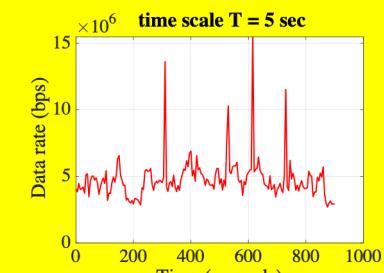
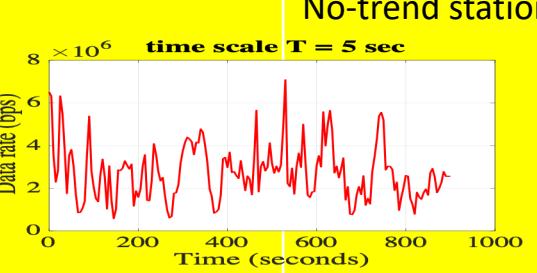
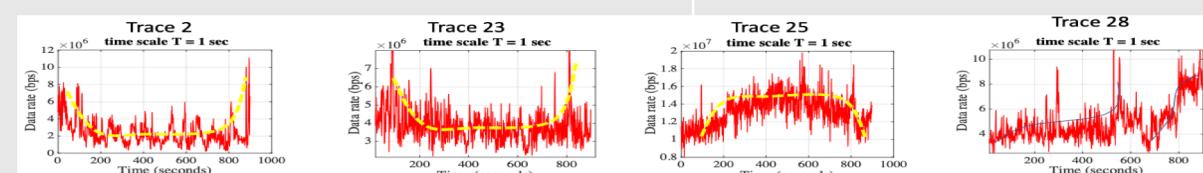
Twente, Auckland, Waikato and Caida

- Both ADF and PP tests give consistent results for ~all traces at different T values, while KPSS test provides different results based on enabling/disabling the trend option.
- The results of KPSS test can be categorised as follows:

	Run KPSS with 'trend = true'	Run KPSS with 'trend = false' i.e. no-trend
KPSS case 1: Trend stationary ONLY	Trend stationary	Non-stationary
KPSS case 2: No-trend stationary ONLY	Non-stationary	No-trend stationary
KPSS case 3: Both trend and no-trend stationary (i.e., KPSS returns stationary in both cases: trend = true and trend = false)	Trend stationary	No-trend stationary
KPSS case 4: Neither trend nor no-trend stationary (i.e., KPSS returns non-stationary in both cases trend = true and trend = false)	Non-stationary	Non-stationary

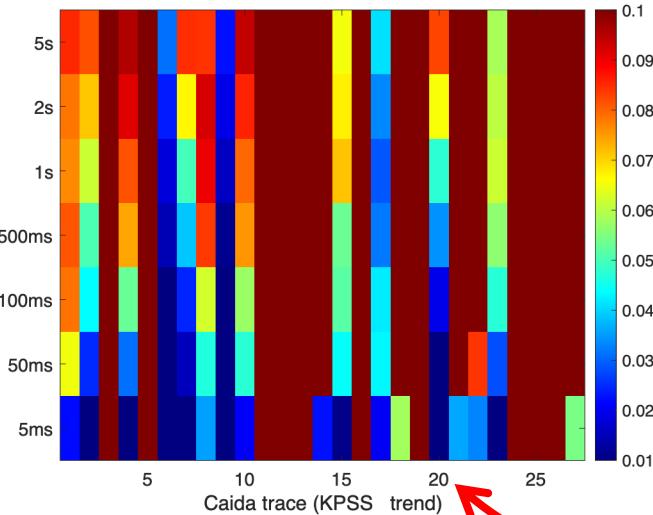
Examples



	Run KPSS with 'trend = true'	Run KPSS with 'trend = false' i.e. no-trend
KPSS case 1: Trend stationary ONLY	Trend stationary 	Non-stationary
KPSS case 2: No-trend stationary ONLY	Non-stationary	No-trend stationary 
KPSS case 3: Both trend and no-trend stationary (i.e., KPSS returns stationary in both cases: trend = true and trend = false)	Trend stationary 	No-trend stationary
KPSS case 4: Neither trend nor no-trend stationary (i.e., KPSS returns non-stationary in both cases trend = true and trend = false)	Non-stationary 	Non-stationary

- I guess we should consider the results when the KPSS results are stationary , i.e., we run KPSS tests twice first with trend and another time with no-trend and then we filter the results by picking the stationary results from the two runs. The only case where we will get non-stationary is when both runs (trend and no-trend) return non-stationary. Sample results 

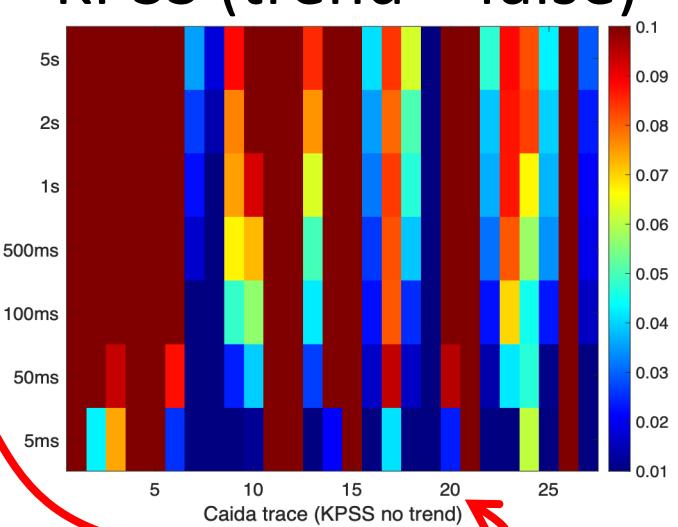
KPSS (trend = true)



- KPSS: p-value > 0.05 → stationary

e.g., trace 20 is non-stationary (at most timescales) when using trend KPSS while it is stationary when using no-trend KPSS, so we pick the results of the no-trend KPSS for this trace.

KPSS (trend = false)

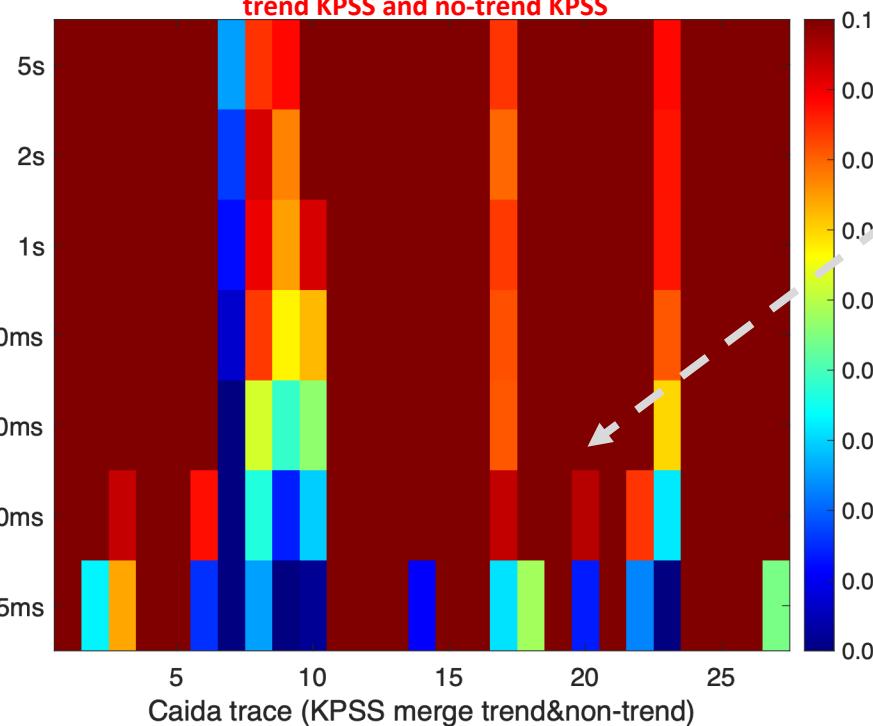


- The results when using KPSS ‘trend’ on 27 CAIDA traces: 9 traces are trend stationary

1. Trace 8
2. Trace 13
3. Trace 16
4. Trace 18
5. Trace 19
6. Trace 22
7. Trace 24
8. Trace 25
9. Trace 27

- While the other traces (18 traces) are stationary based on no-trend KPSS (they are no-trend stationary traces).

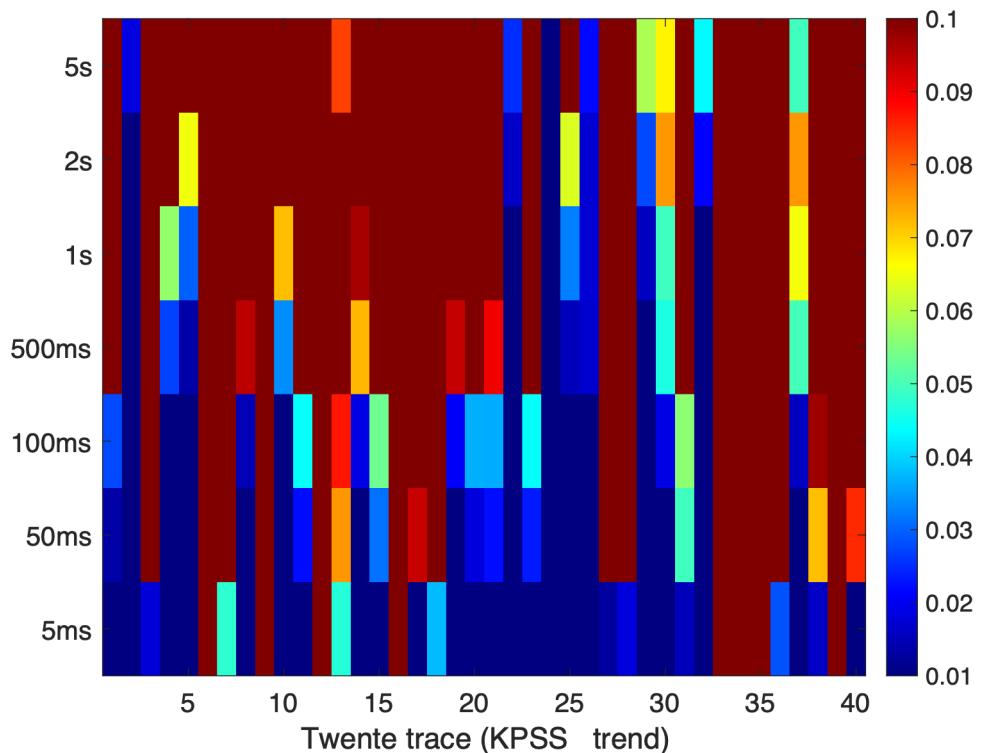
The combined (filtered) results between
trend KPSS and no-trend KPSS



Stationarity tests

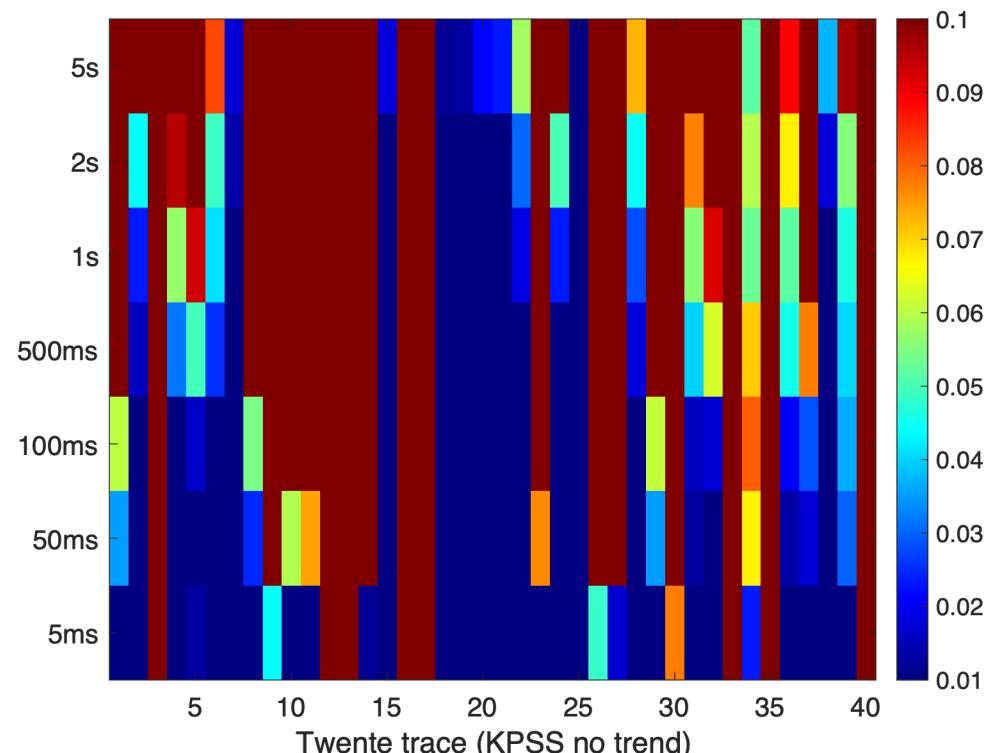
Twente Traces

KPSS (trend = true)

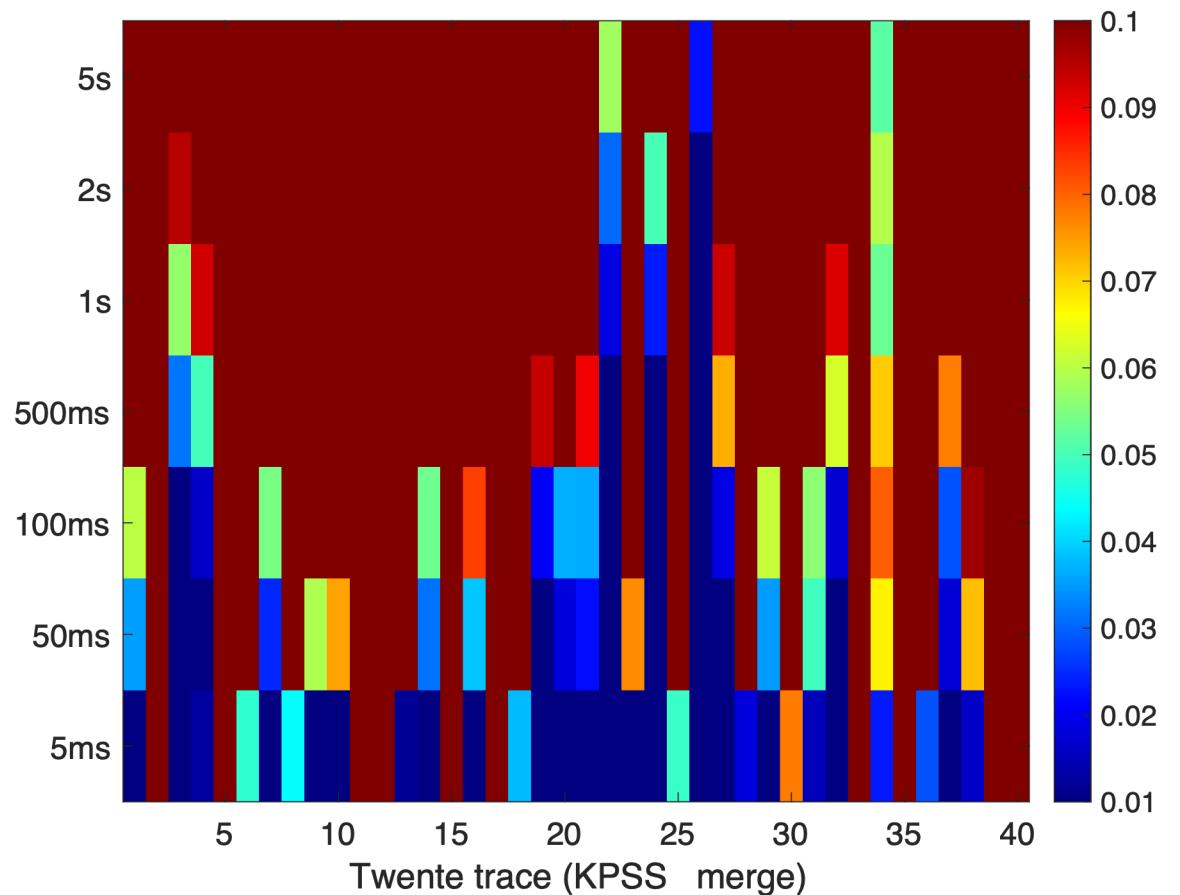


Using the 'trend' option

KPSS (trend = false)



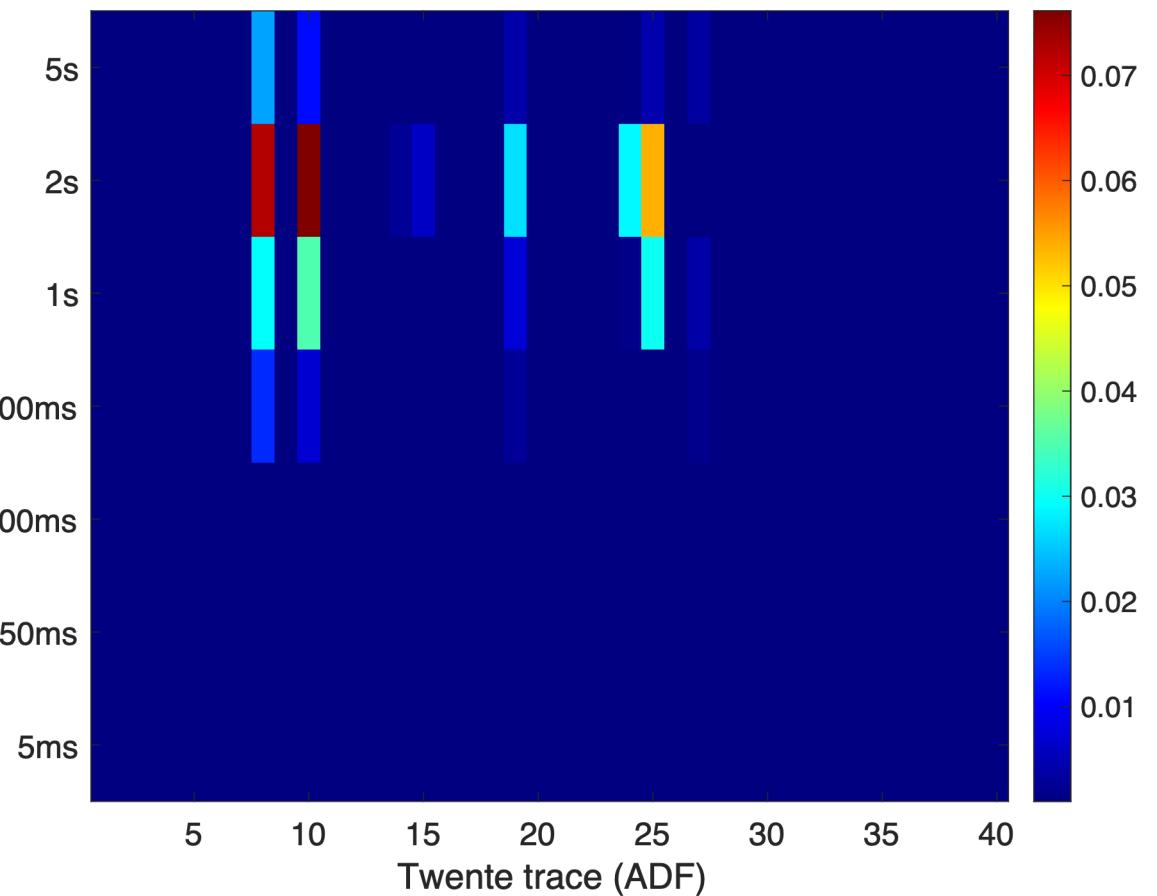
Disabling the 'trend' option



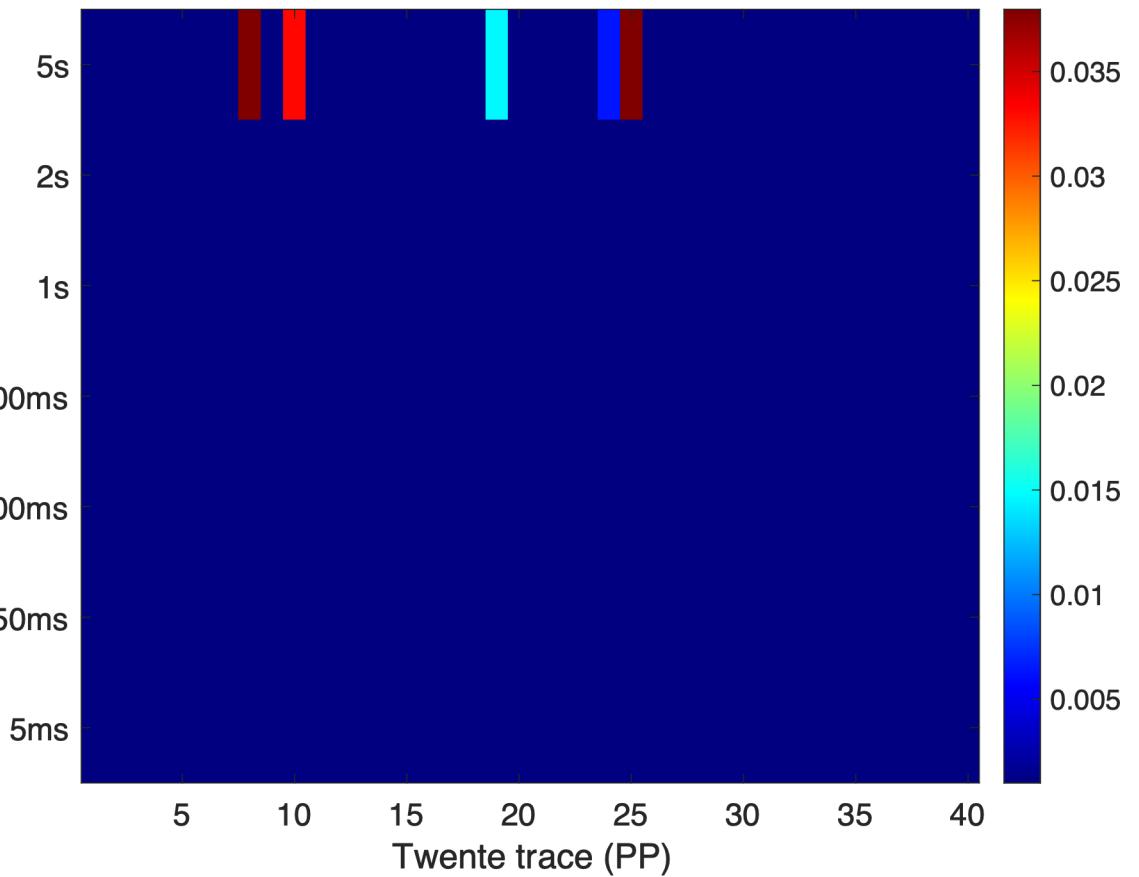
Twente

- ADF&PP: p-value < 0.05 → stationary

ADF



PP



{'5ms'}

{'50ms'}

{'100ms'}

{'500ms'}

{'1s'}

{'2s'}

{'5s'}

#data_points = 179989

17999

9000

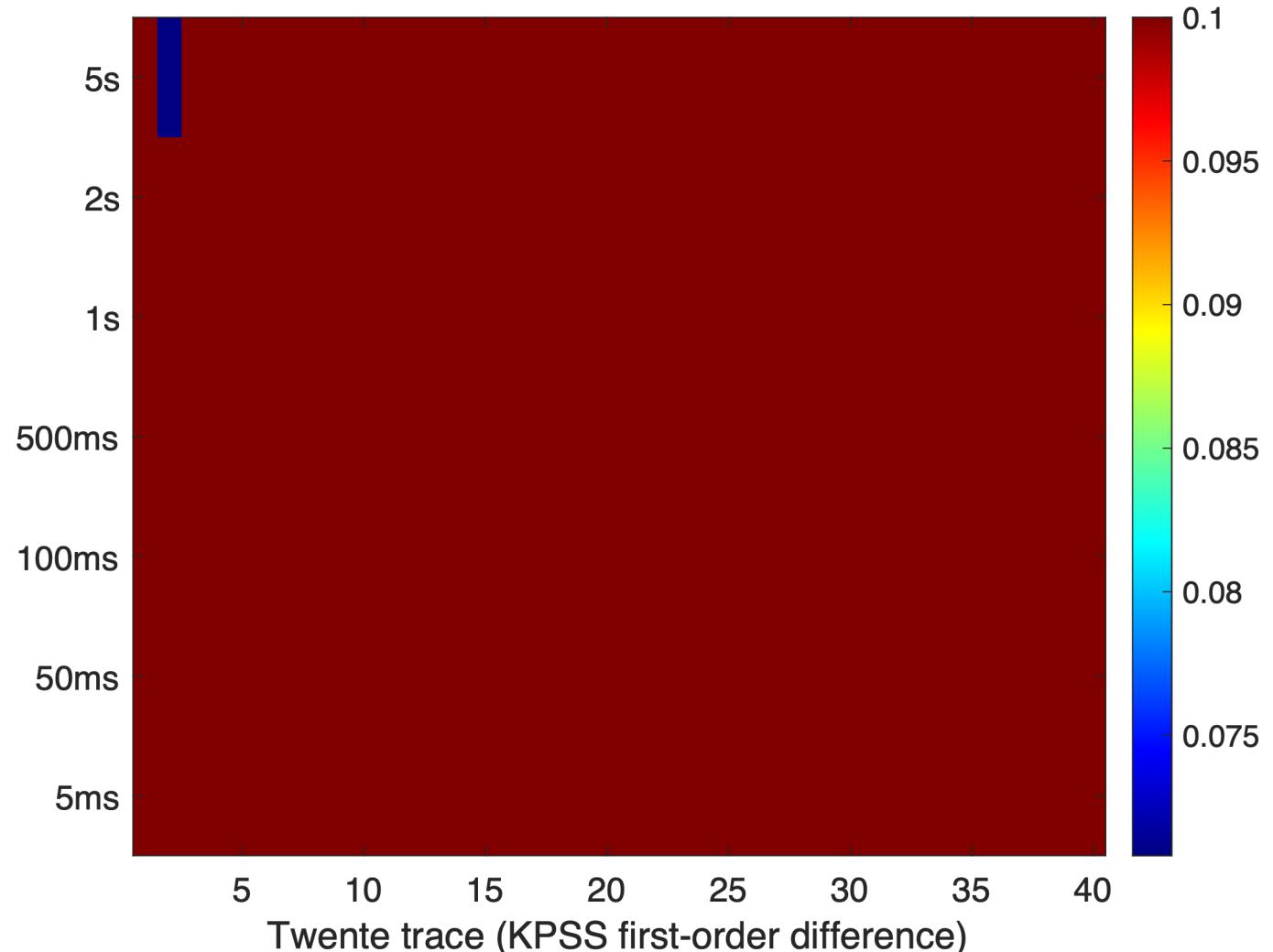
1800

900

450

180

KPSS first-order difference

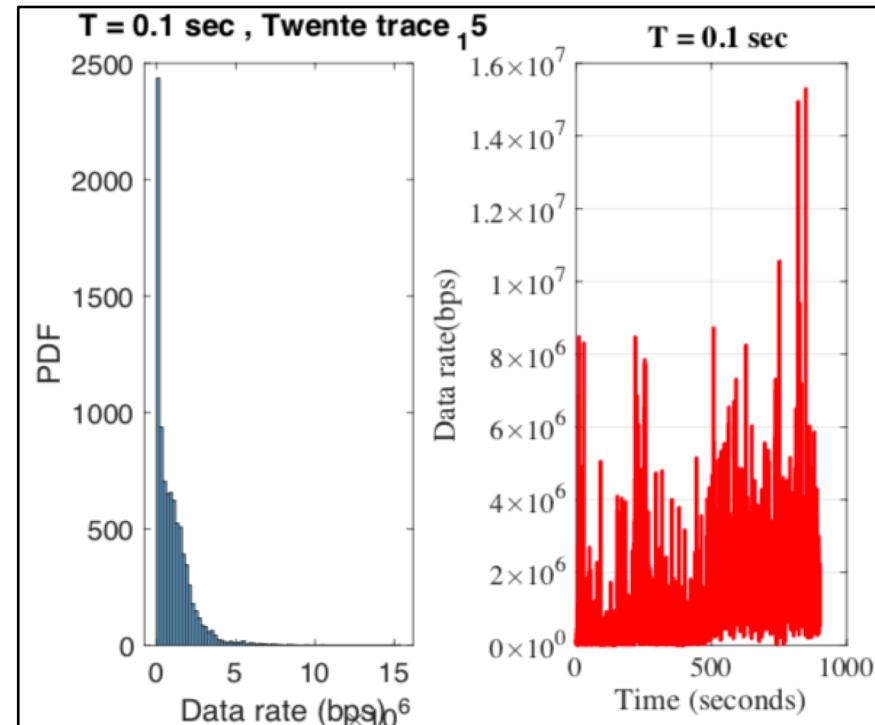


Twente Examples: KPSS Trend only

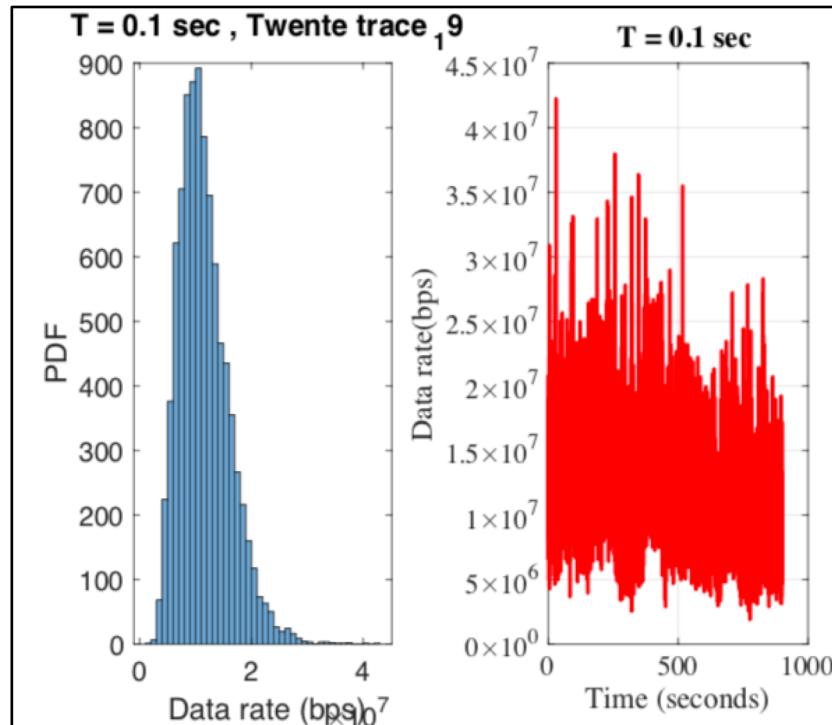
KPSS case 1

i.e., KPSS shows stationary when using ‘trend = true’ and shows non-stationary when using ‘trend = false’

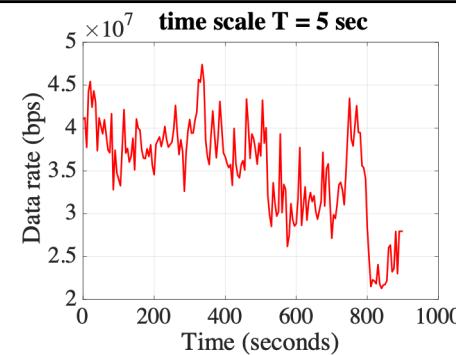
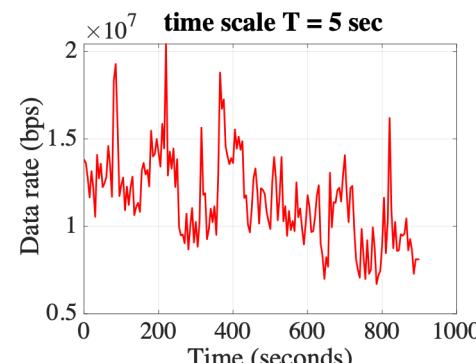
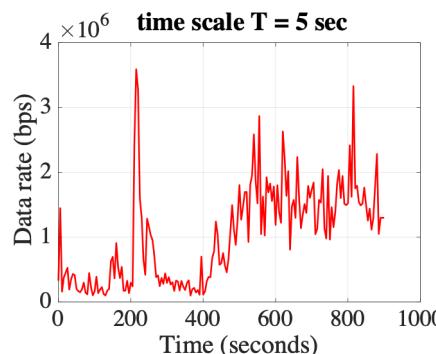
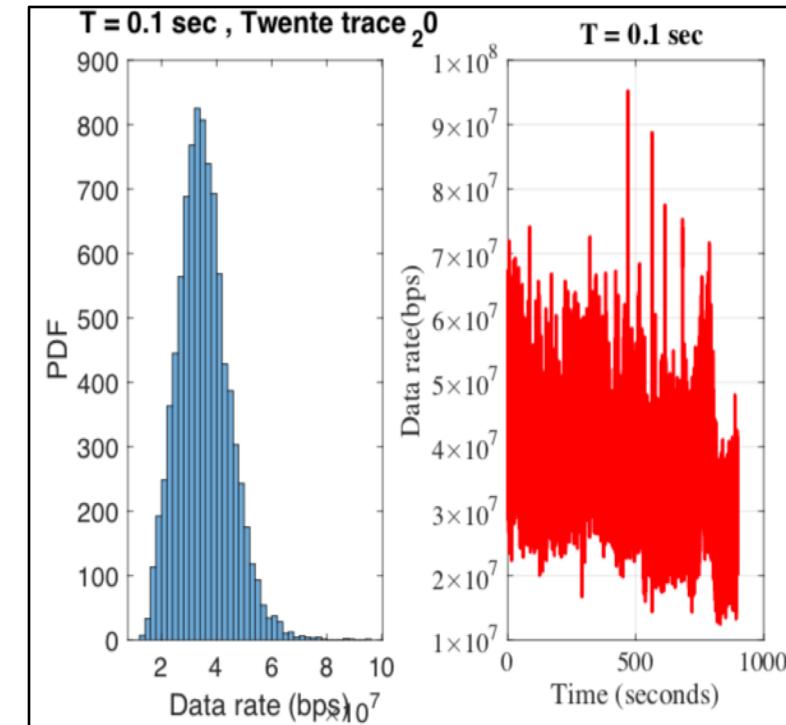
Trace 15



Trace 19



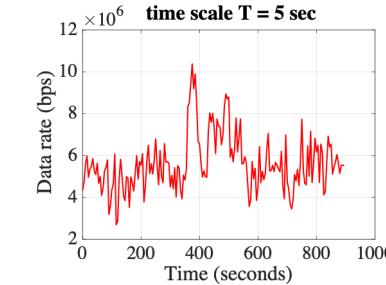
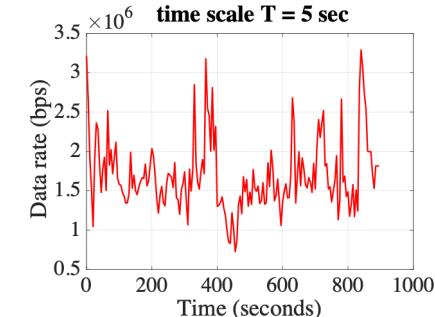
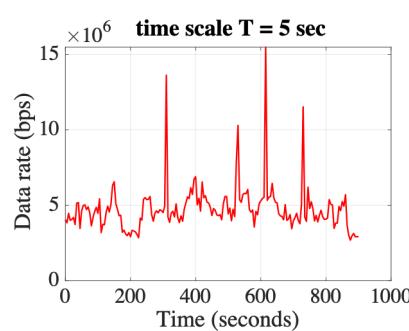
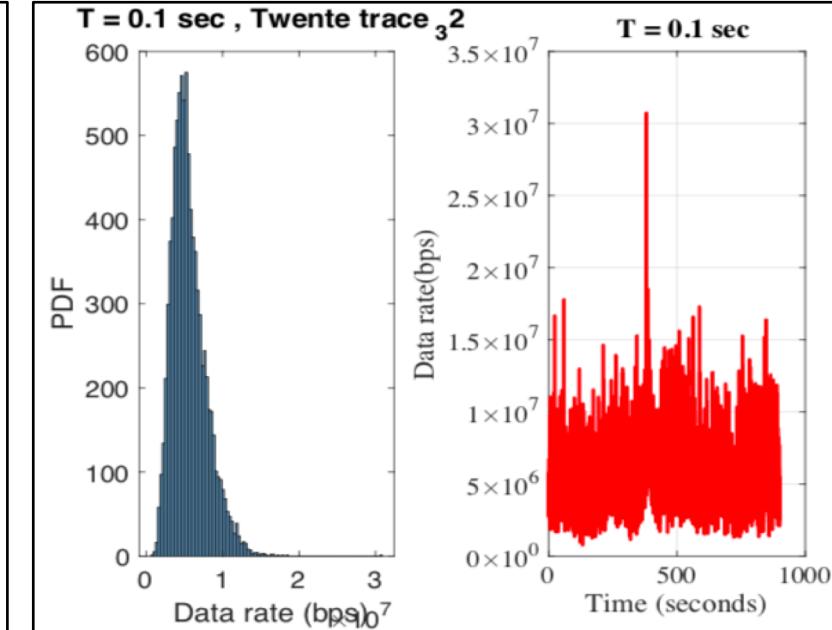
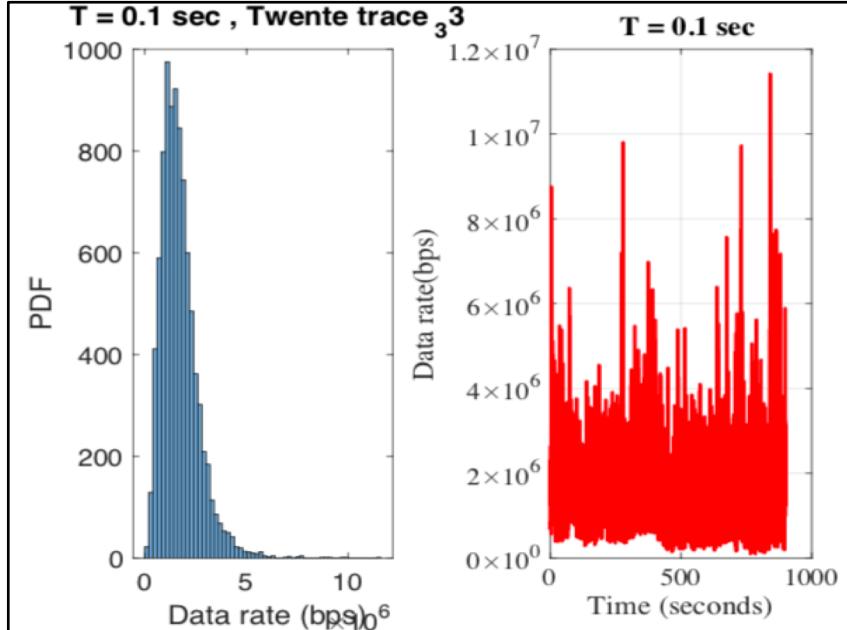
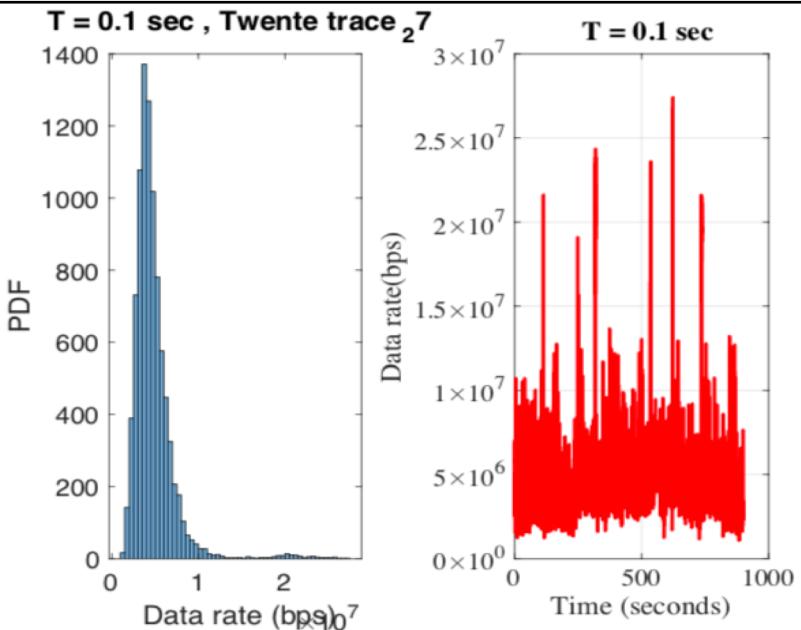
Trace 20



Twente Examples: Non-trend only

KPSS case 2

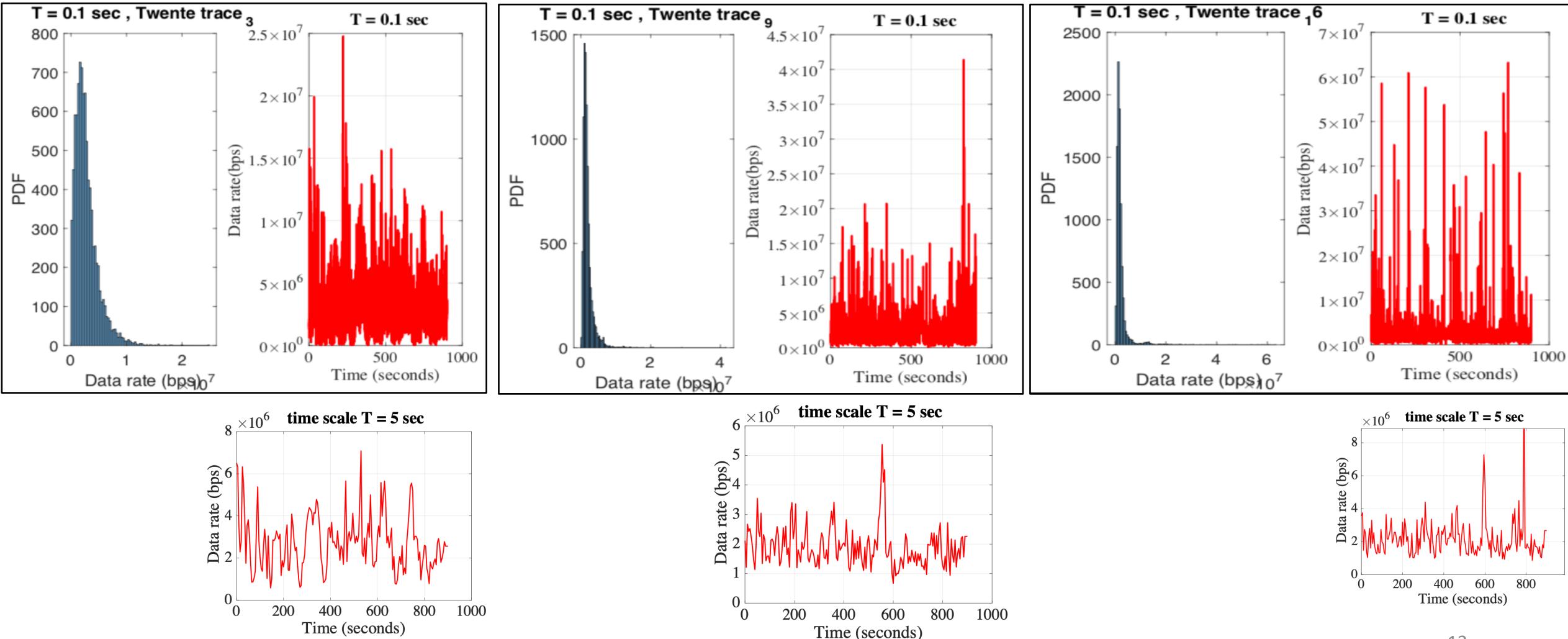
i.e., KPSS shows stationary when using 'trend = false' and shows non-stationary when using 'trend = true'



Twente Examples: Both Trend & non-trend

KPSS case 3

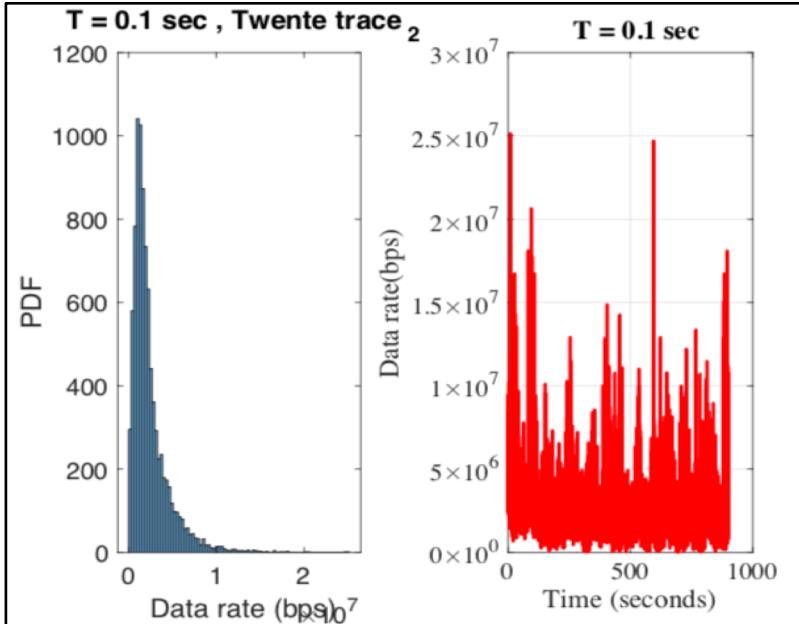
i.e., KPSS shows stationary when either using 'trend = false' or 'trend = true'



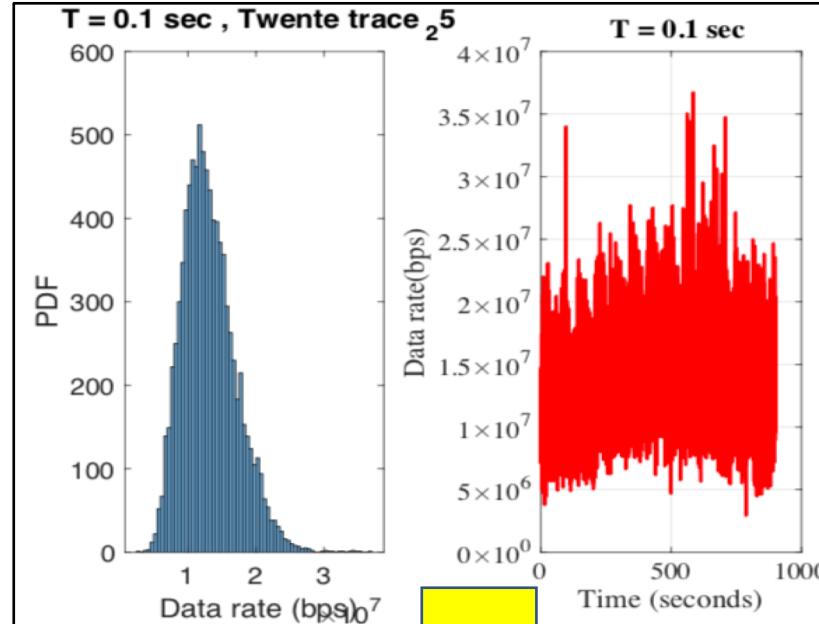
Twente Examples: Neither Trend nor non-trend at all T values

i.e., KPSS shows non-stationary when either using 'trend = false' or 'trend = true'

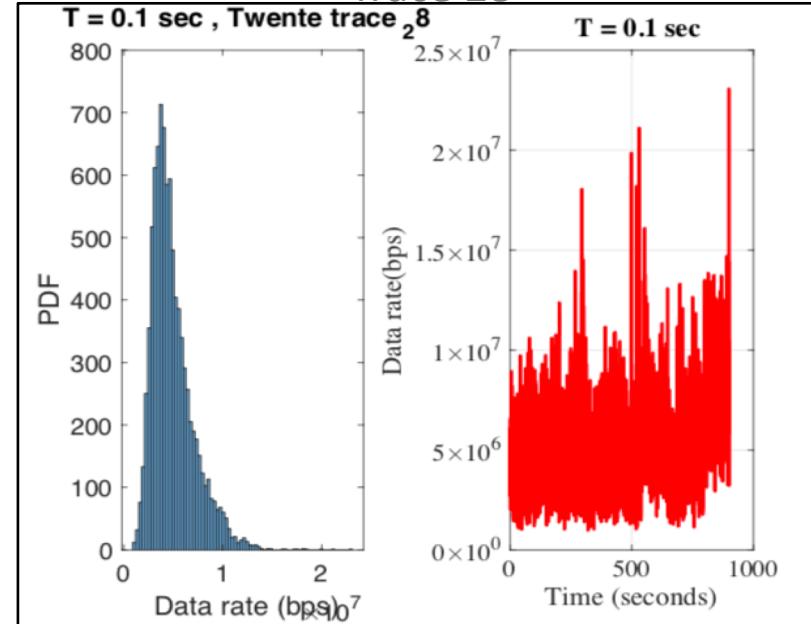
Trace 2



Trace 25



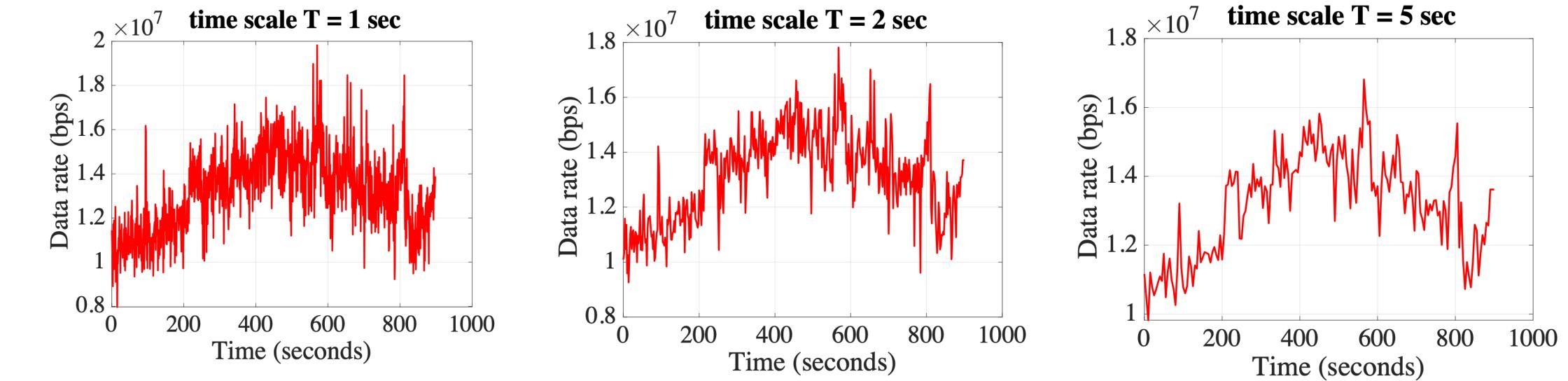
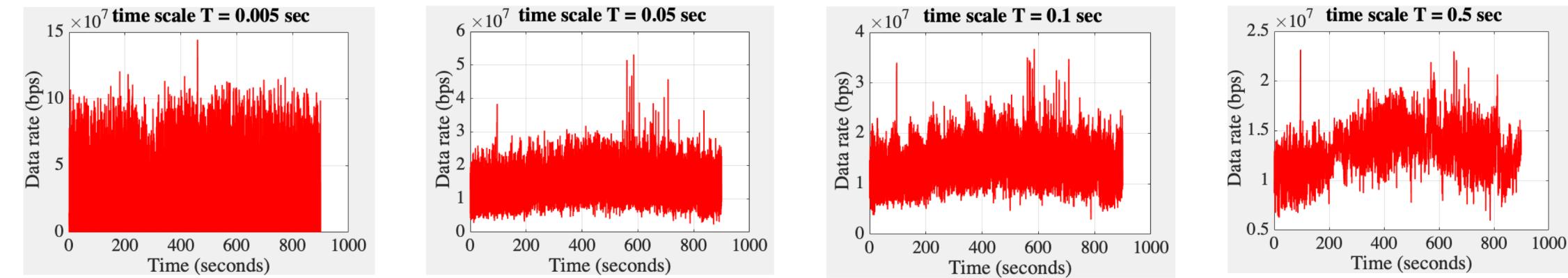
Trace 28



Twente Trace 25

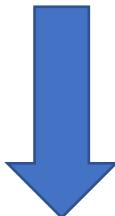


Twente Trace 25



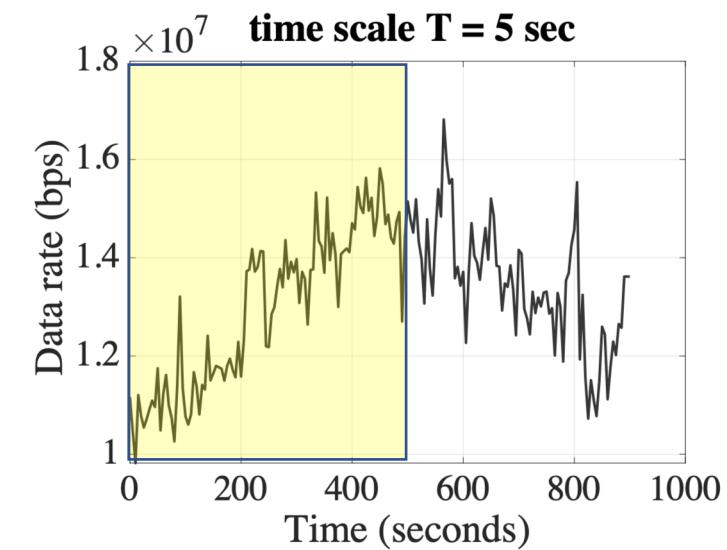
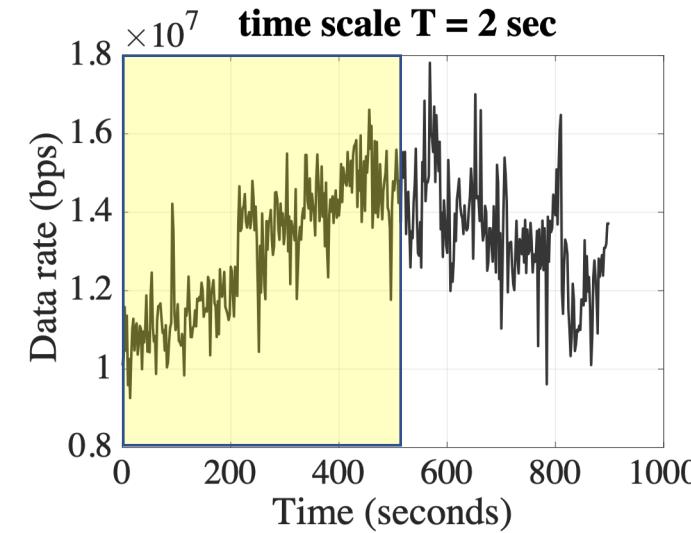
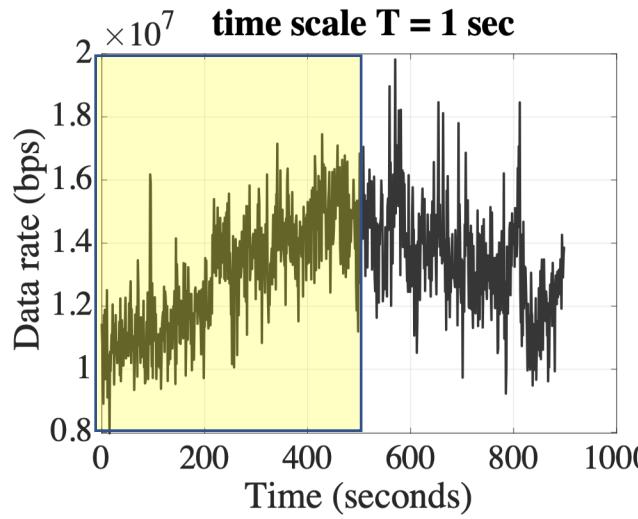
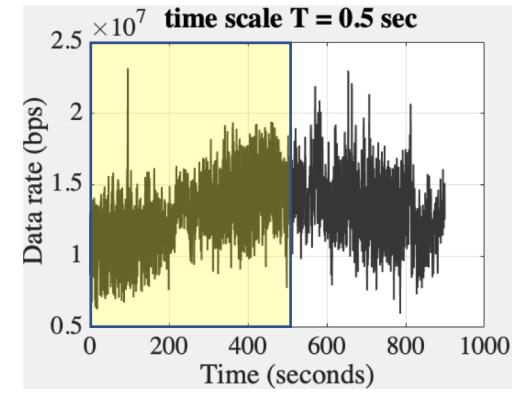
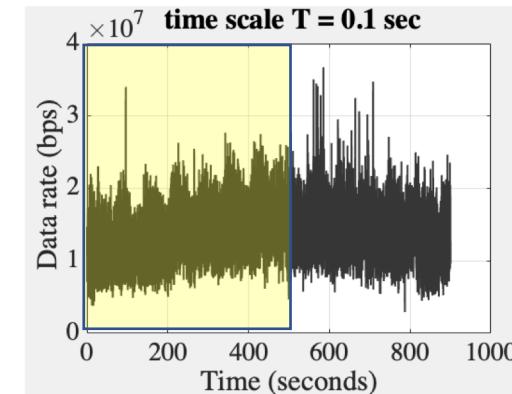
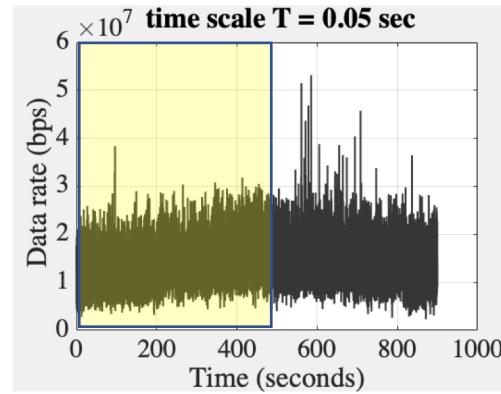
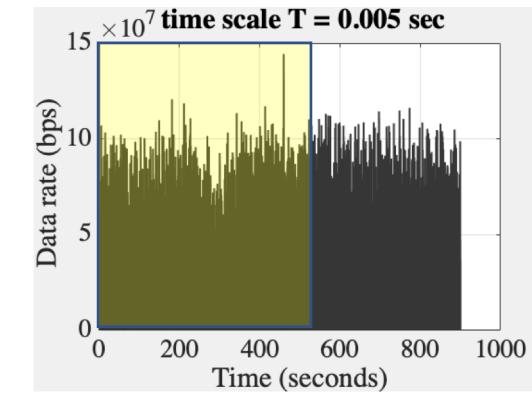
<code>{'5ms'}</code>	<code>{'50ms'}</code>	<code>{'100ms'}</code>	<code>{'500ms'}</code>	<code>{'1s'}</code>	<code>{'2s'}</code>	<code>{'5s'}</code>
KPSS 'trend' = false	{'Non'}	{'Non'}	{'Non'}	{'Non'}	{'S'}	{'S'}
KPSS 'trend' = true	{'Non'}	{'Non'}	{'Non'}	{'Non'}	{'Non'}	{'Non'}

Neither trend nor non-trend stationary



Twente Trace 25

Re-run KPSS test at the first half of the data points ONLY
(there is a trend in this half, so we expect it to be trend stationary)



{ '5ms' }
KPSS 'trend' = false
{'Non'}
KPSS 'trend' = true
{'S' }

{ '50ms' }
{'Non'}
{'S' }

{ '100ms' }
{'Non'}
{'S' }

{ '500ms' }
{'Non'}
{'S' }

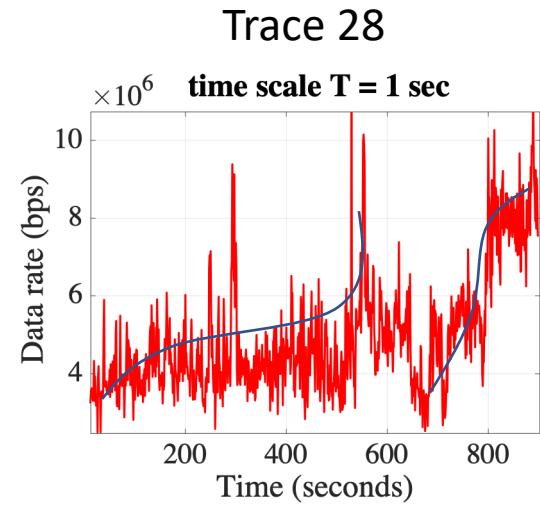
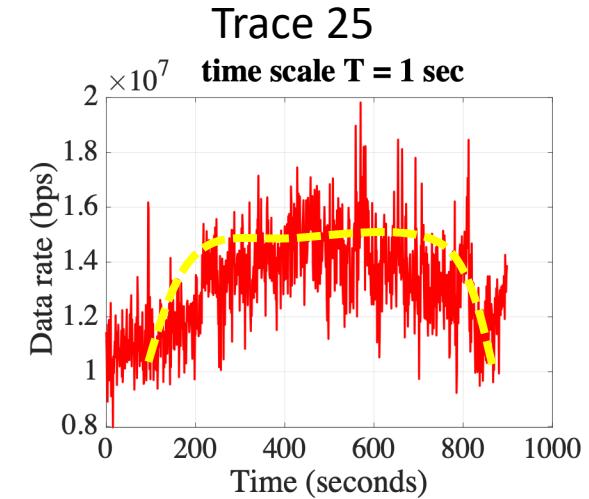
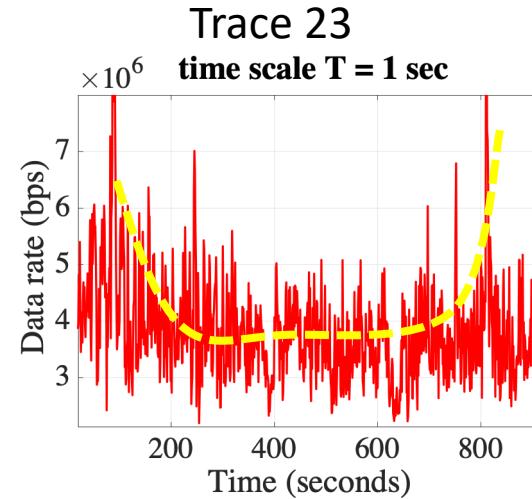
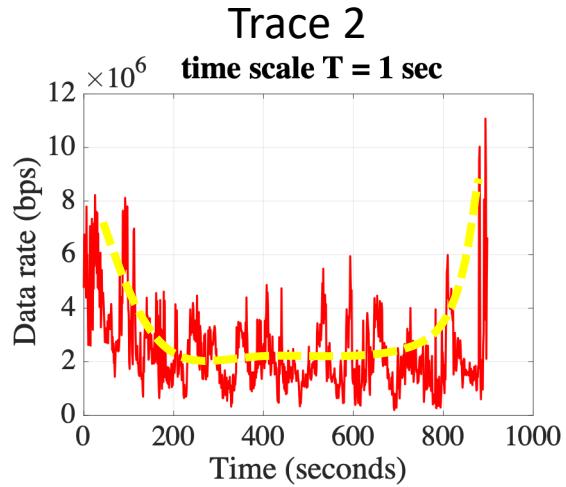
{ '1s' }
{'Non'}
{'S' }

{ '2s' }
{'Non'}
{'S' }

{ '5s' }
{'Non'}
{'S' }

as expected

KPSS failed to show stationary for these Twente traces



Twente

```
pss_non_trend_results  
kpss_trend_results  
kpss_diff_results  
adf_results  
pp_results
```

KPSS neither trend nor non-trend (4/43):

Trace 2

Trace 23

Trace 25

Trace 28

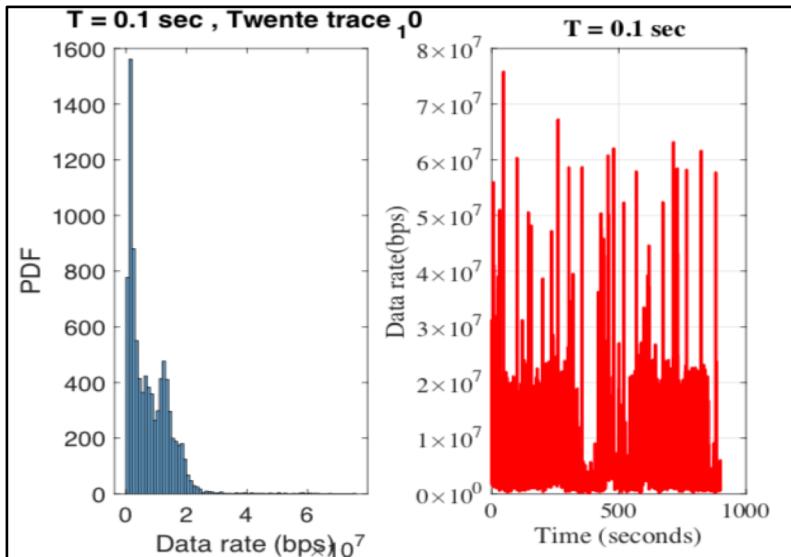
= { 'S' }

	'trace_16'	'trace_17'	'trace_18'	'trace_19'	'trace_20'
A	{'S'} {'S'} {'S'} {'S'} {'S'} {'S'}	{'Non'} {'Non'} {'Non'} {'Non'} {'Non'} {'Non'}	{'S'} {'S'} {'S'} {'S'} {'S'} {'S'}	{'Non'} {'Non'} {'Non'} {'Non'} {'Non'} {'Non'}	{'Non'} {'Non'} {'Non'} {'Non'} {'Non'} {'Non'}
D	{'S'} {'S'} {'S'} {'S'} {'S'} {'S'}	{'Non'} {'Non'} {'Non'} {'Non'} {'Non'} {'Non'}	{'S'} {'S'} {'S'} {'S'} {'S'} {'S'}	{'Non'} {'Non'} {'Non'} {'Non'} {'Non'} {'Non'}	{'Non'} {'Non'} {'Non'} {'Non'} {'Non'} {'Non'}
F	{'S'} {'S'} {'S'} {'S'} {'S'} {'S'}	{'Non'} {'Non'} {'Non'} {'Non'} {'Non'} {'Non'}	{'S'} {'S'} {'S'} {'S'} {'S'} {'S'}	{'Non'} {'Non'} {'Non'} {'Non'} {'Non'} {'Non'}	{'Non'} {'Non'} {'Non'} {'Non'} {'Non'} {'Non'}
J	{'S'} {'S'} {'S'} {'S'} {'S'} {'S'}	{'Non'} {'Non'} {'Non'} {'Non'} {'Non'} {'Non'}	{'S'} {'S'} {'S'} {'S'} {'S'} {'S'}	{'Non'} {'Non'} {'Non'} {'Non'} {'Non'} {'Non'}	{'Non'} {'Non'} {'Non'} {'Non'} {'Non'} {'Non'}

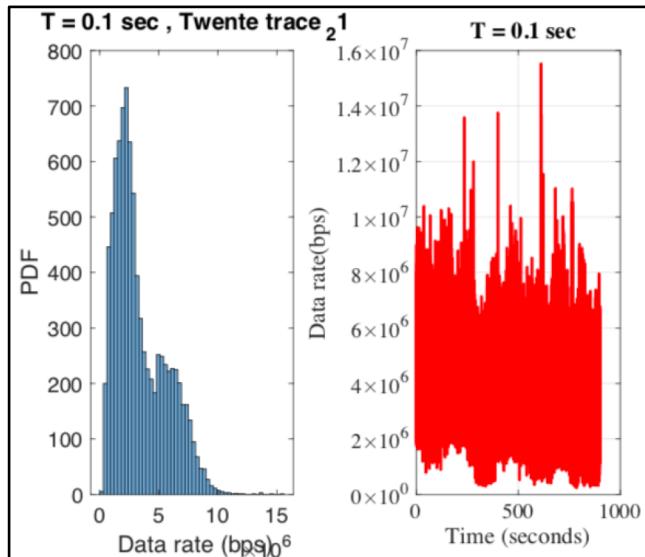
KPSS non-trend (26/43)

The Twente anomalous traces (5/40)

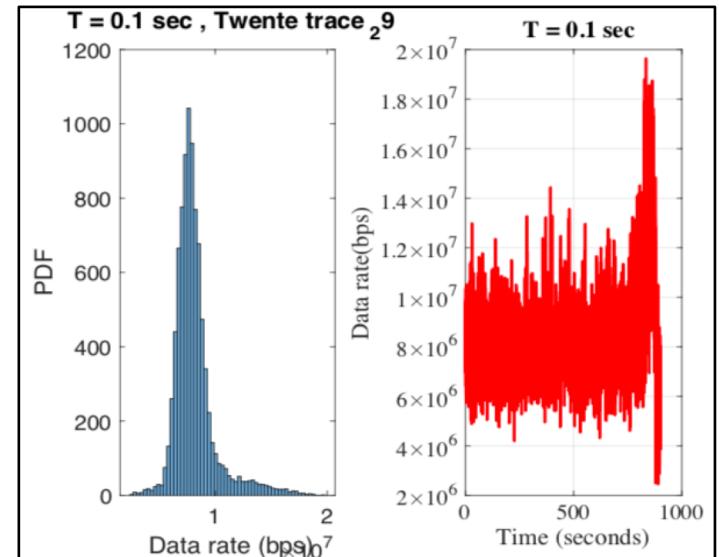
Trace 10



Trace 21



Trace 29

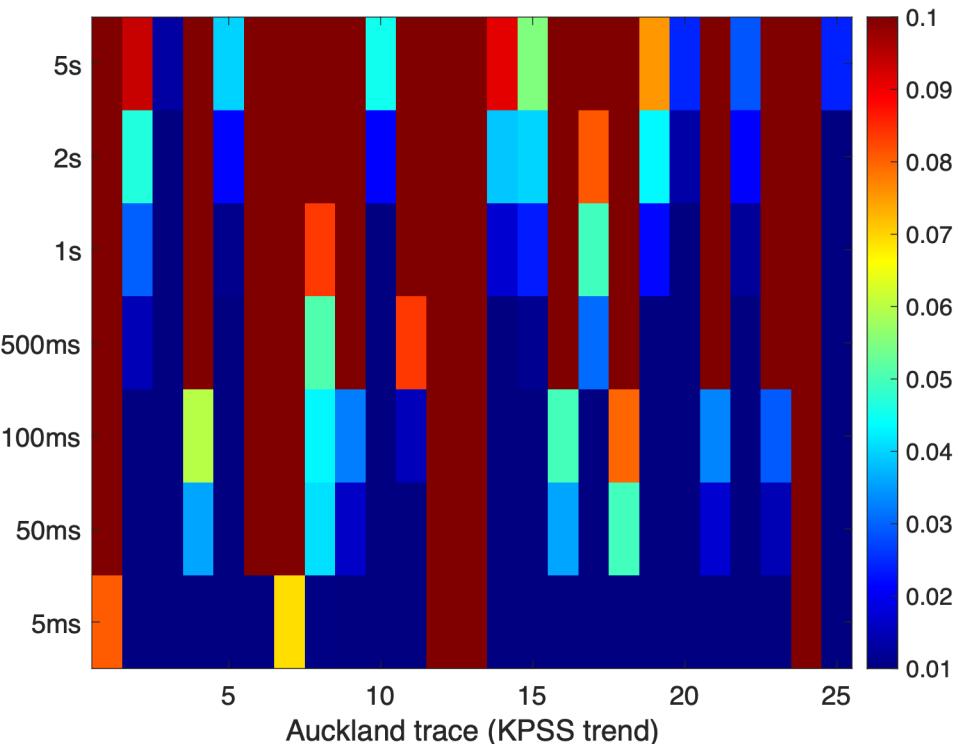


...

Stationarity tests

Auckland Traces

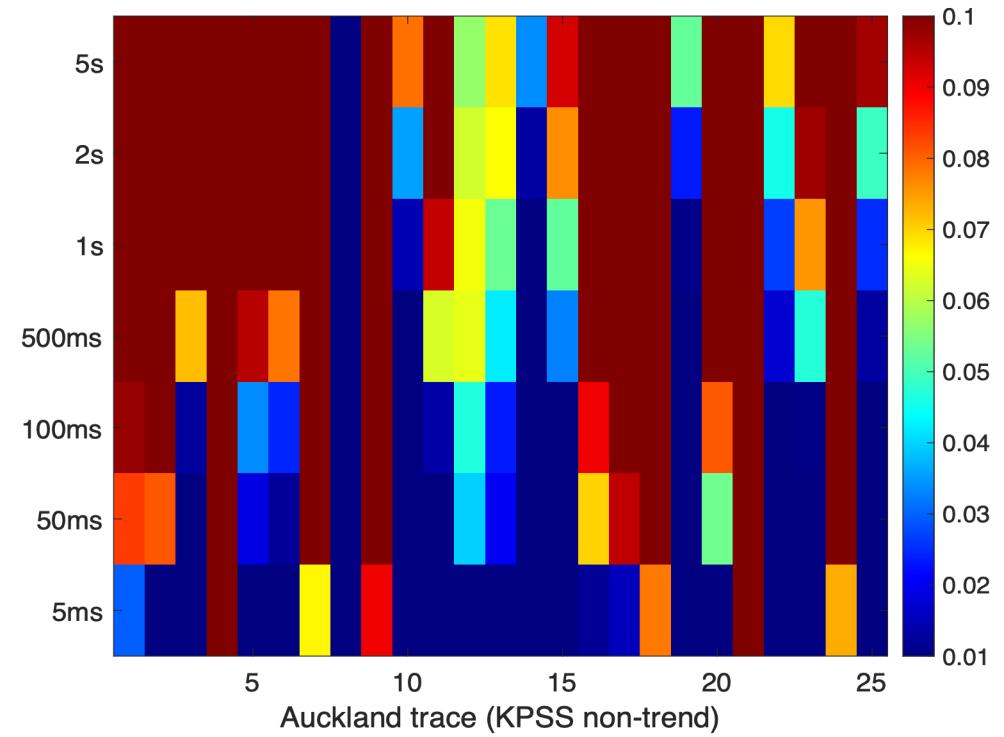
KPSS (trend = true)



Using the 'trend' option

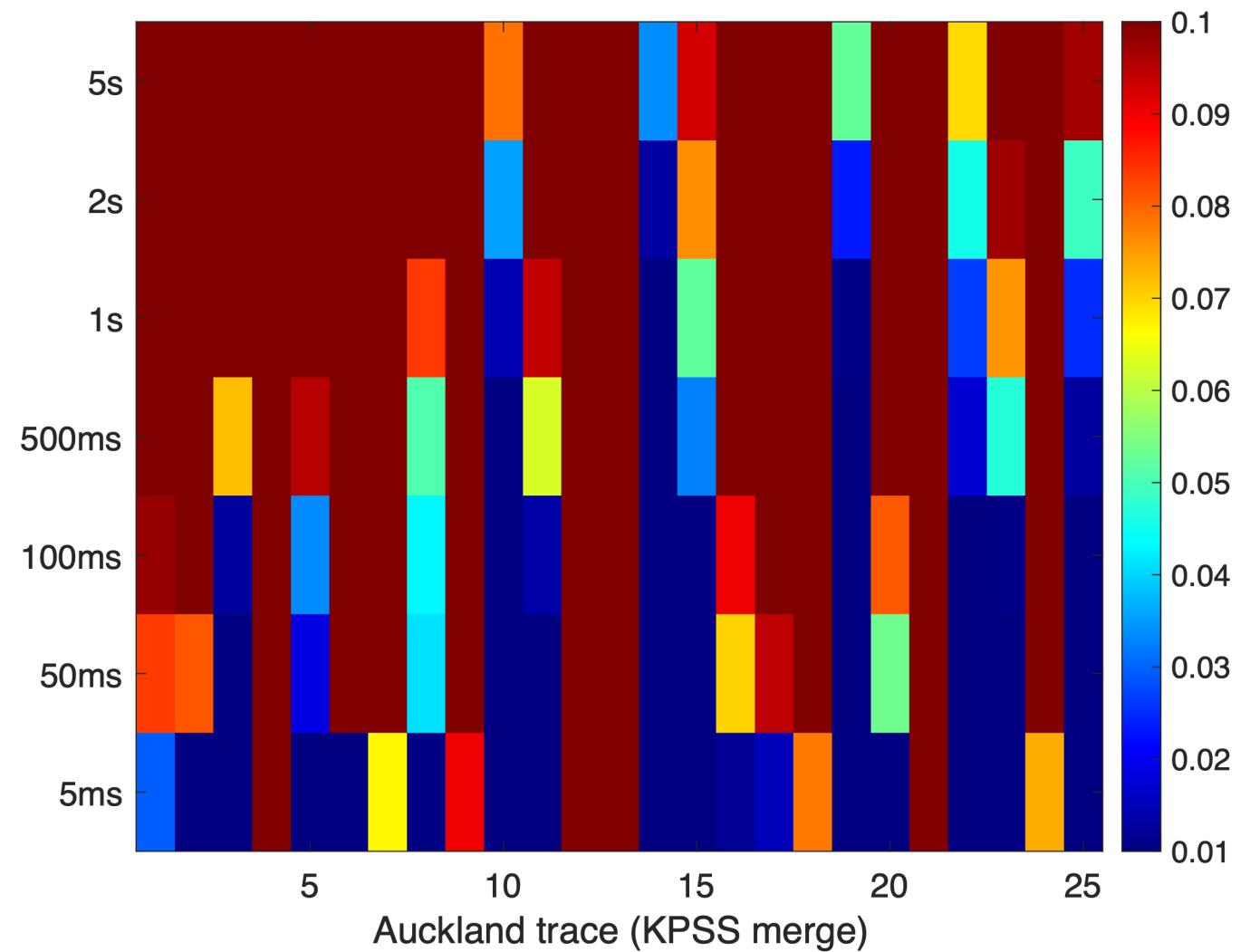


KPSS (trend = false)



Disabling the 'trend' option

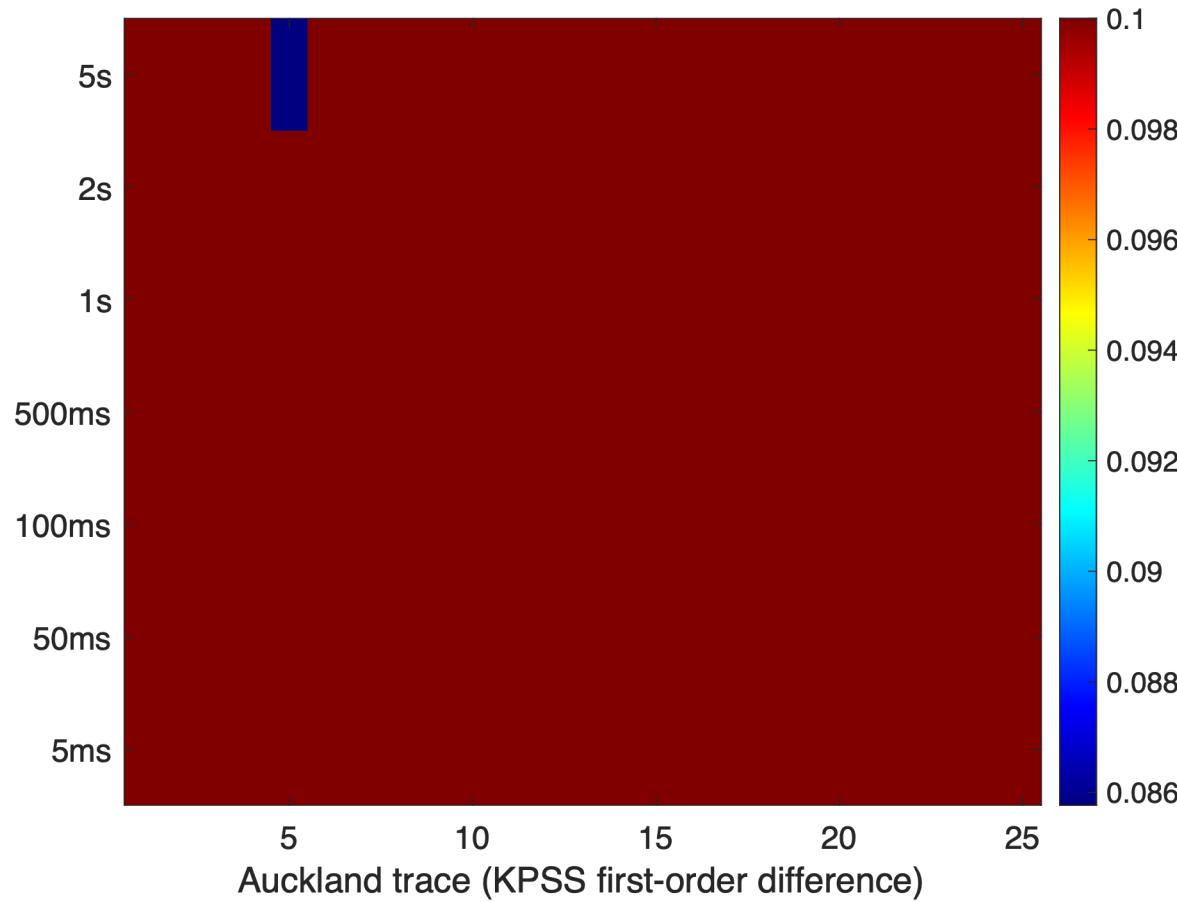




Auckland

- KPSS: p-value > 0.05 → stationary

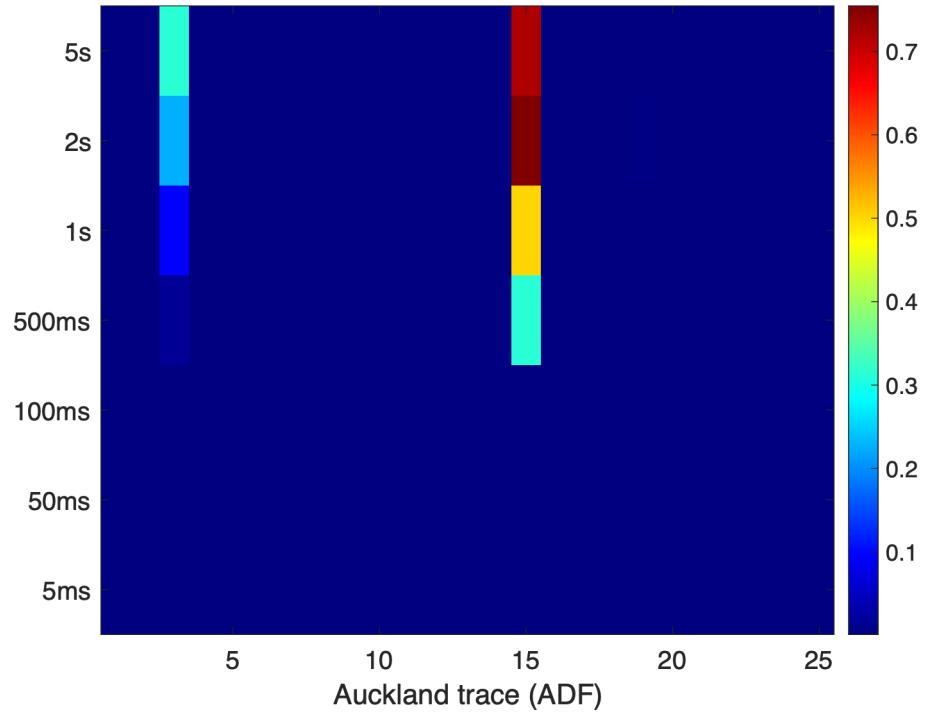
KPSS first-order difference



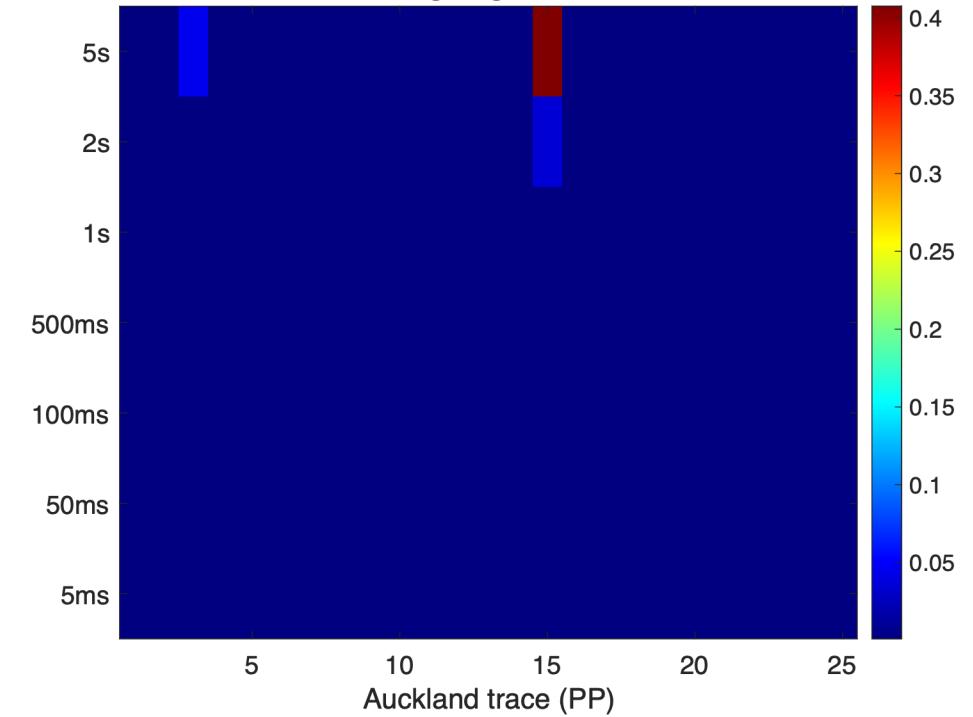
Auckland

- ADF&PP: p-value < 0.05 → stationary

ADF

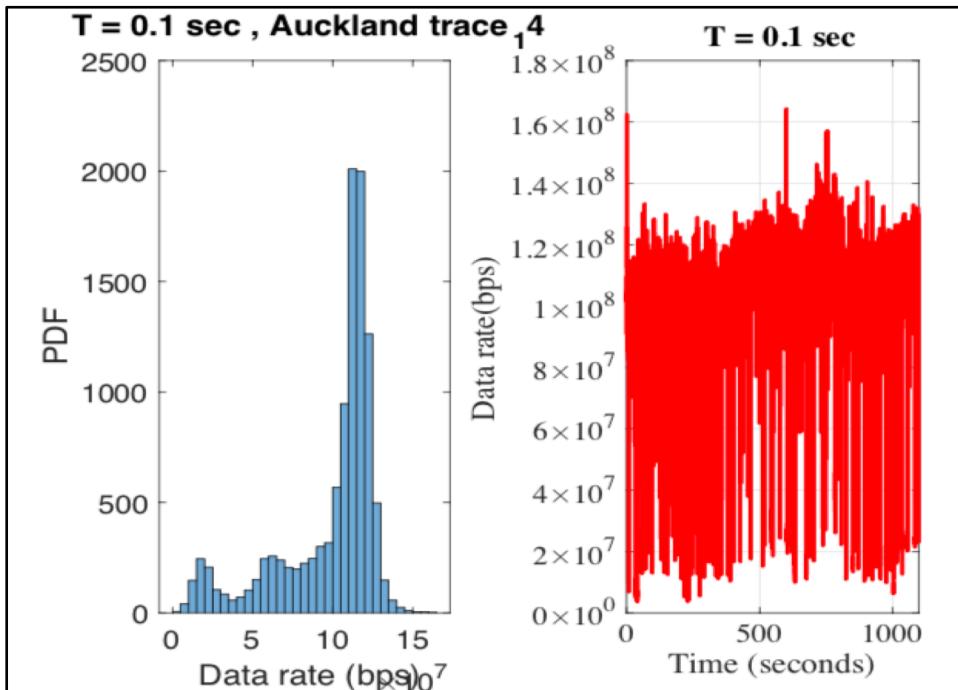


PP

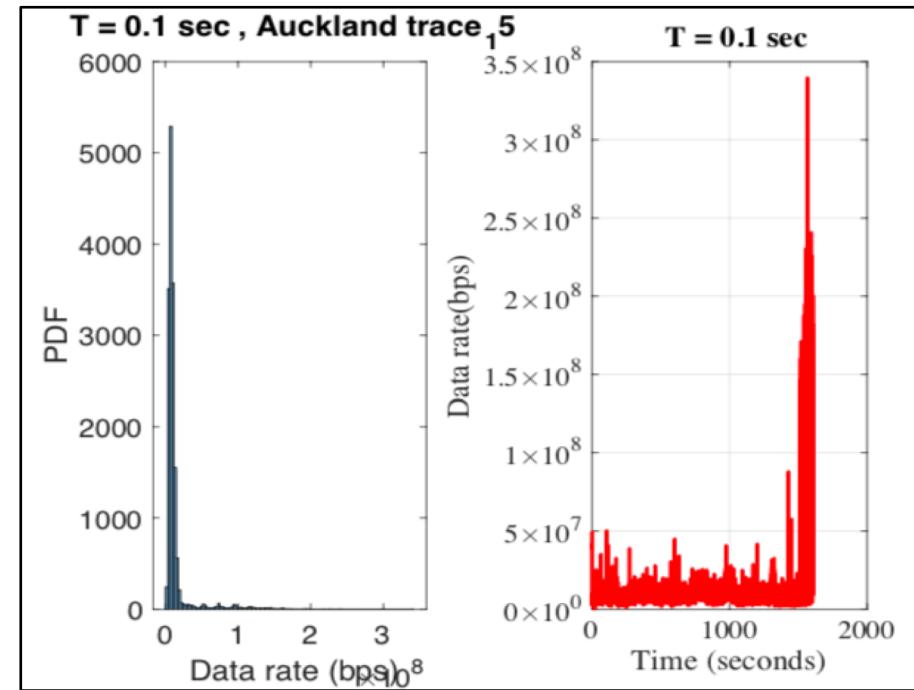


The Auckland anomalous traces (2/25)

Trace 14



Trace 15

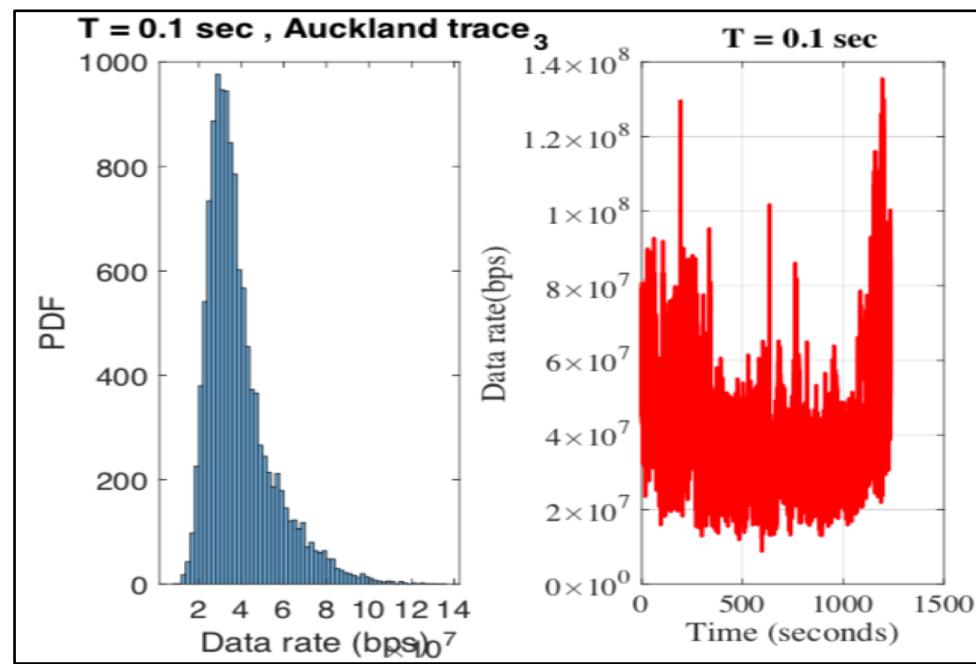


	{'5ms'}	{'50ms'}	{'100ms'}	{'500ms'}	{'1s'}	{'2s'}	{'5s'}
Kpss_non_trend_result	{'Non'}	{'Non'}	{'Non'}	{'Non'}	{'Non'}	{'Non'}	{'Non'}
kpss_trend_results	{'Non'}	{'Non'}	{'Non'}	{'Non'}	{'Non'}	{'Non'}	{'S'}
kpss_diff_results	{'S'}	{'S'}	{'S'}	{'S'}	{'S'}	{'S'}	{'S'}
adf_results	{'S'}	{'S'}	{'S'}	{'S'}	{'S'}	{'S'}	{'S'}
pp_results	{'S'}	{'S'}	{'S'}	{'S'}	{'S'}	{'S'}	{'S'}

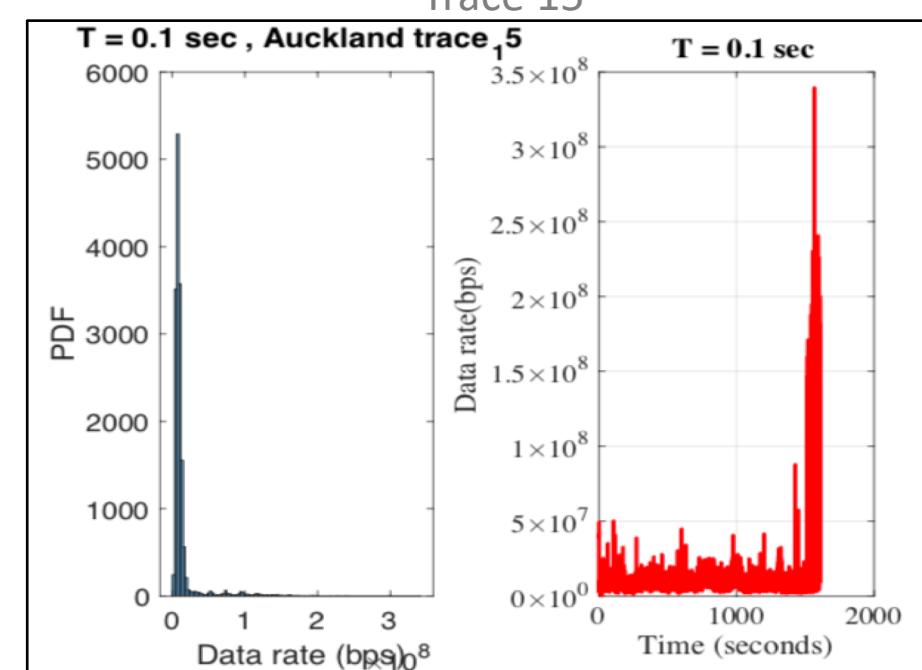
	{'5ms'}	{'50ms'}	{'100ms'}	{'500ms'}	{'1s'}	{'2s'}	{'5s'}
{'Non'}	{'Non'}	{'Non'}	{'Non'}	{'S'}	{'S'}	{'S'}	{'S'}
{'Non'}	{'Non'}	{'Non'}	{'Non'}	{'Non'}	{'Non'}	{'Non'}	{'S'}
{'S'}	{'S'}	{'S'}	{'S'}	{'S'}	{'S'}	{'S'}	{'S'}
{'S'}	{'S'}	{'S'}	{'S'}	{'Non'}	{'Non'}	{'Non'}	{'Non'}
{'S'}	{'S'}	{'S'}	{'S'}	{'S'}	{'S'}	{'S'}	{'Non'}

ADF shows non-stationary for trace3 and trace15

Trace 3



Trace 15

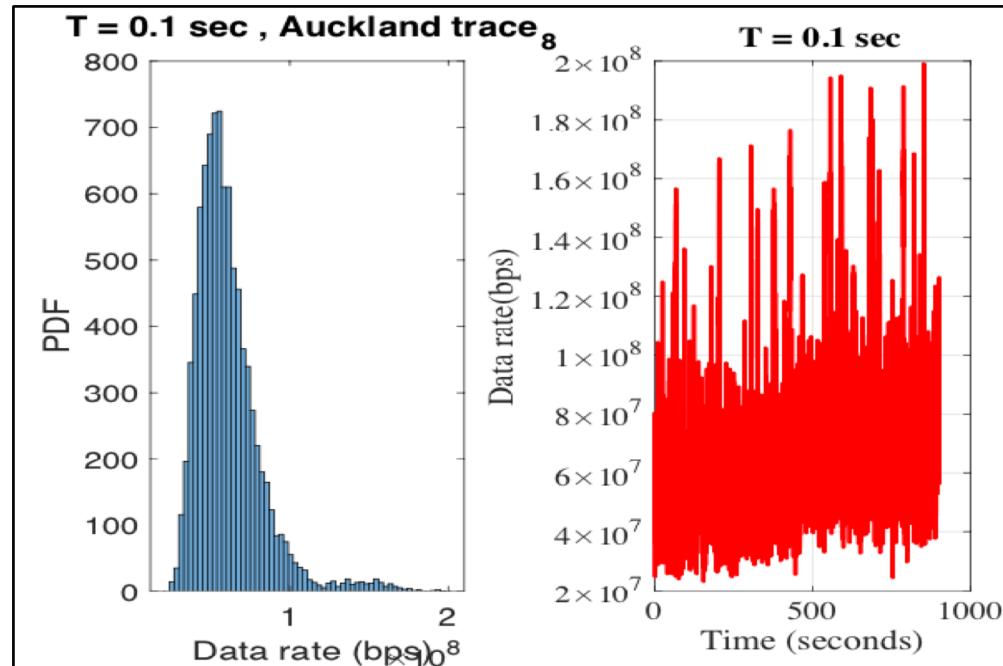


	{'5ms'}	{'50ms'}	{'100ms'}	{'500ms'}	{'1s'}	{'2s'}	{'5s'}	{'5ms'}	{'50ms'}	{'100ms'}	{'500ms'}	{'1s'}	{'2s'}	{'5s'}
Kpss_non_trend_results	{'Non'}	{'Non'}	{'Non'}	{'S' }	{'S' }	{'S' }	{'S' }	{'Non'}	{'Non'}	{'Non'}	{'Non'}	{'S' }	{'S' }	{'S' }
kpss_trend_results	{'Non'}	{'Non'}	{'Non'}	{'Non'}	{'Non'}	{'Non'}	{'Non'}	{'Non'}	{'Non'}	{'Non'}	{'Non'}	{'Non'}	{'Non'}	{'S' }
kpss_diff_results	{'S' }	{'S' }	{'S' }	{'S' }	{'S' }	{'S' }	{'S' }	{'S' }	{'S' }	{'S' }	{'S' }	{'S' }	{'S' }	{'S' }
adf_results	{'S' }	{'S' }	{'S' }	{'S' }	{'Non'}	{'Non'}	{'Non'}	{'S' }	{'S' }	{'S' }	{'S' }	{'Non'}	{'Non'}	{'Non'}
pp_results	{'S' }	{'S' }	{'S' }	{'S' }	{'S' }	{'S' }	{'S' }	{'S' }	{'S' }	{'S' }	{'S' }	{'S' }	{'S' }	{'Non'}

Auckland Examples: Trend only

KPSS case 1

i.e., KPSS shows stationary when using ‘trend = true’ and shows non-stationary when using ‘trend = false’



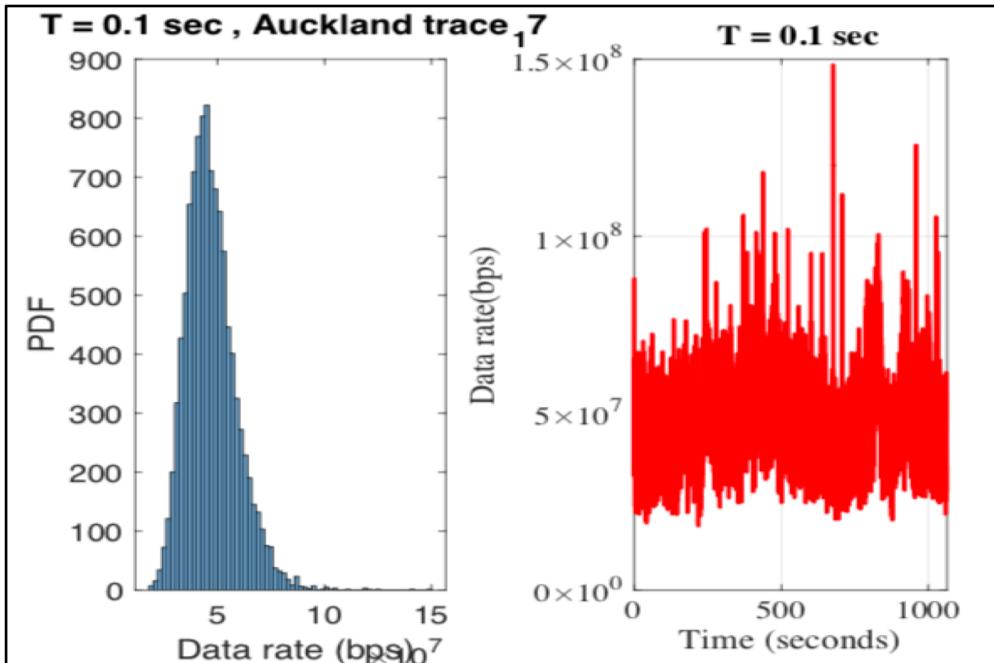
	{'5ms'}	{'50ms'}	{'100ms'}	{'500ms'}	{'1s'}	{'2s'}	{'5s'}
Kpss_non_trend_results	{'Non'}	{'Non'}	{'Non'}	{'Non'}	{'Non'}	{'Non'}	{'Non'}
kpss_trend_results	{'Non'}	{'Non'}	{'Non'}	{'S' }	{'S' }	{'S' }	{'S' }
kpss_diff_results	{'S' }	{'S' }	{'S' }	{'S' }	{'S' }	{'S' }	{'S' }
adf_results	{'S' }	{'S' }	{'S' }	{'S' }	{'S' }	{'S' }	{'S' }
pp_results	{'S' }	{'S' }	{'S' }	{'S' }	{'S' }	{'S' }	{'S' }

Auckland Examples:Non-trend only

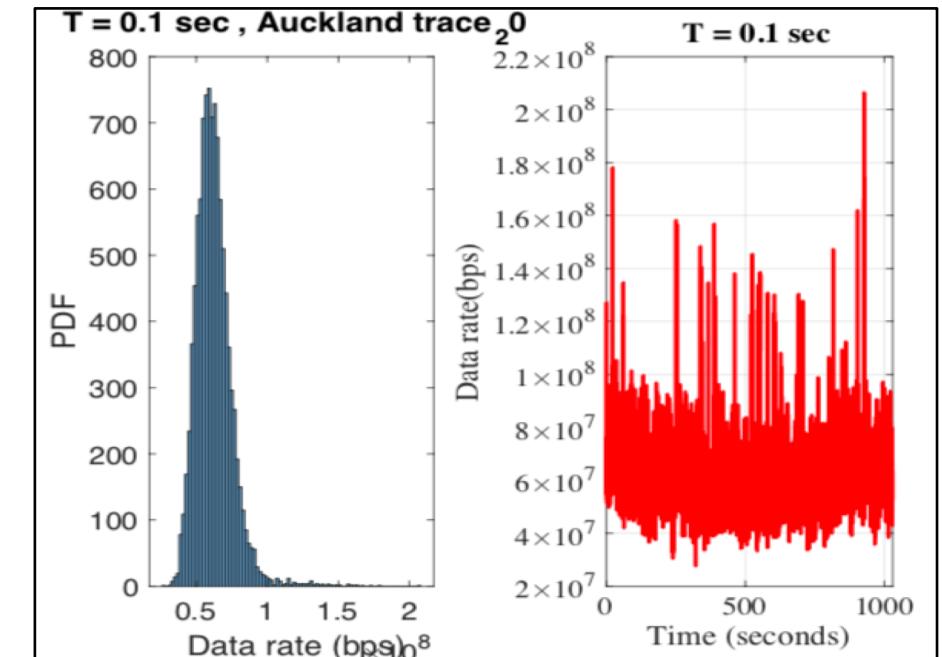
KPSS case 2

i.e., KPSS shows stationary when using 'trend = false' and shows non-stationary when using 'trend = true'

Trace 17

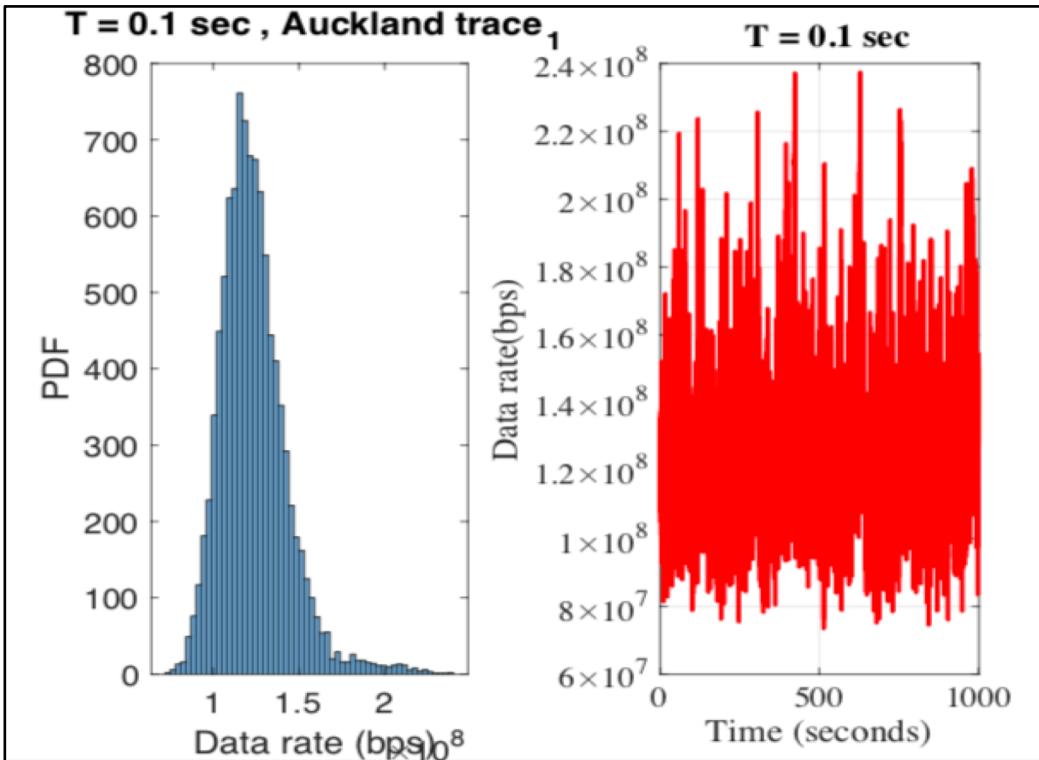


Trace 20

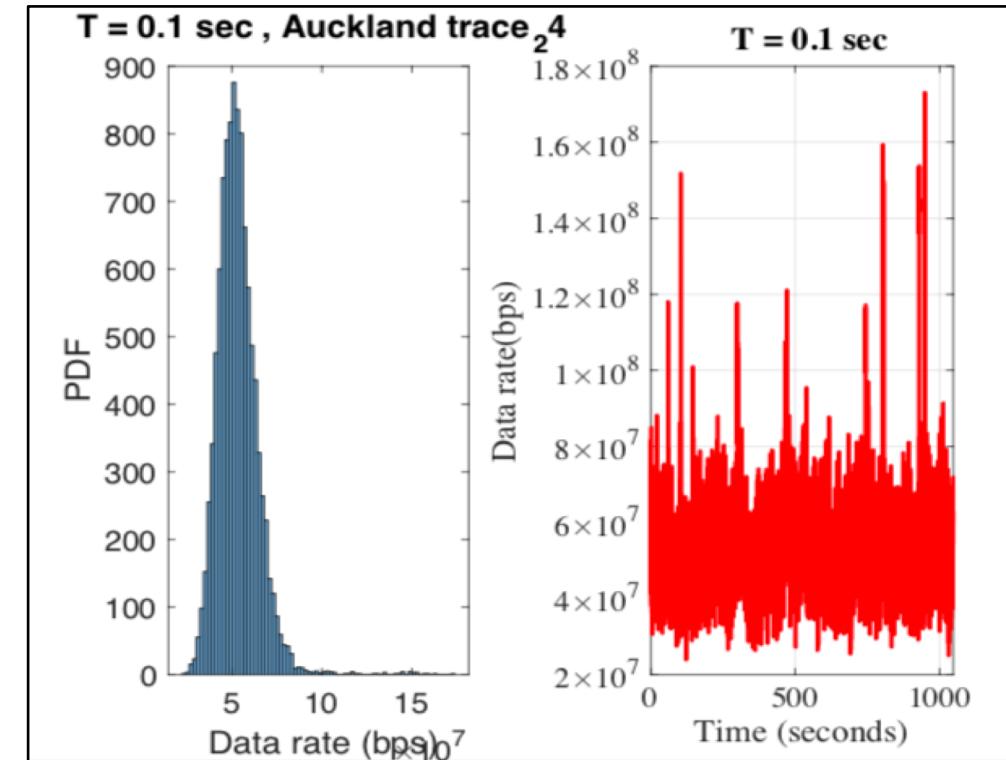


i.e., KPSS shows stationary when either using 'trend = false' or 'trend = true'

Trace 1



Trace 24

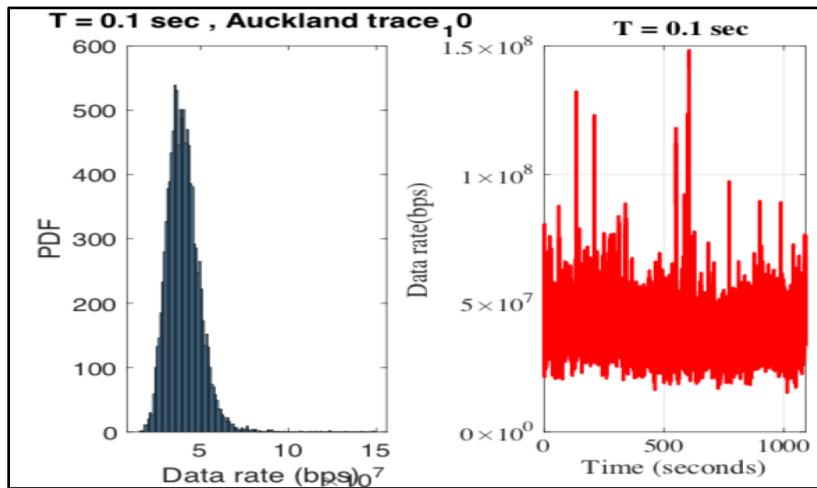


Auckland Examples: Neither Trend nor non-trend at all T values

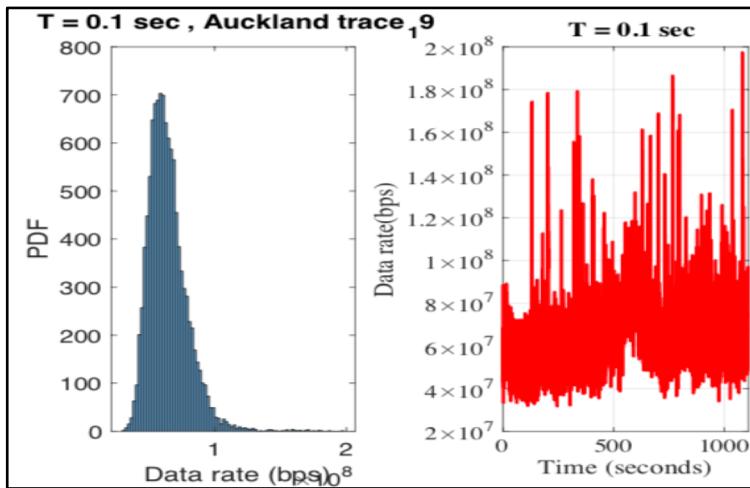
KPSS case 4

i.e., KPSS shows non-stationary when either using 'trend = false' or 'trend = true'

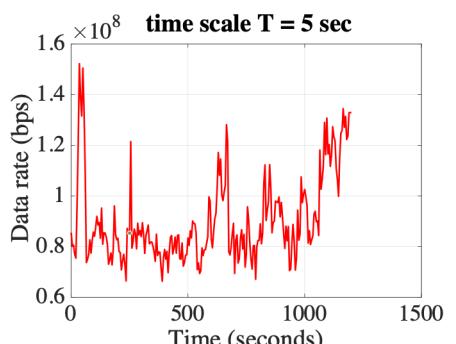
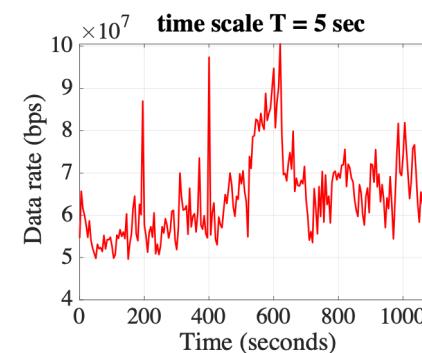
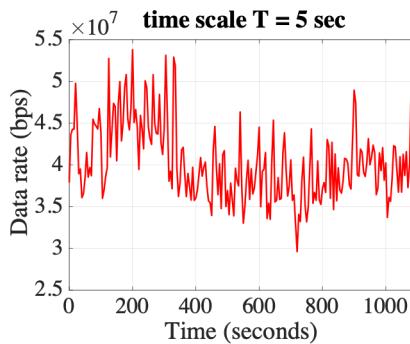
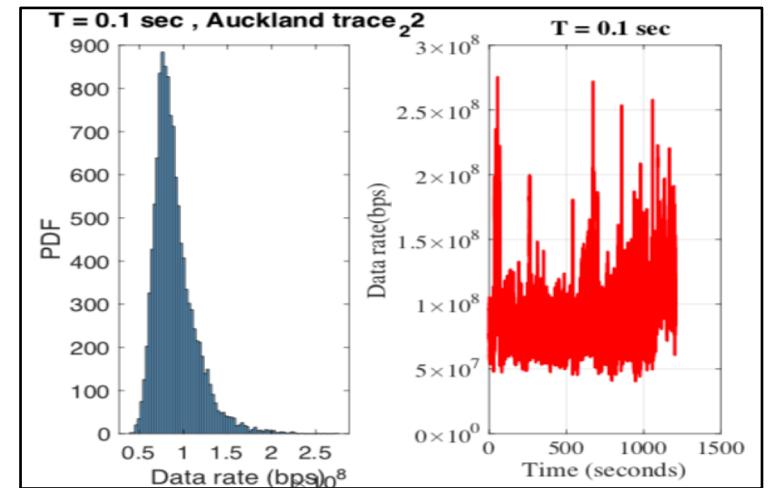
Trace 10



Trace 19



Trace 22



KPSS neither trend nor non-trend (5/25):

Trace 10

Trace 14 ano

Trace 19

Trace 22

Trace 25

KPSS trend only (4/25):

Trace 6

Trace 8

Trace 12

Trace 13

KPSS non-trend (16/25)

	'trace_11'	{'Non'}{'Non'}{'Non'}{'S'}{'S'}{'S'}{'S'}	{'Non'}{'Non'}{'Non'}{'S'}{'S'}{'S'}{'S'}	{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}	{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}	{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}
	'trace_12'	{'Non'}{'Non'}{'Non'}{'S'}{'S'}{'S'}{'S'}	{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}	{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}	{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}	{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}
	'trace_13'	{'Non'}{'Non'}{'Non'}{'Non'}{'S'}{'S'}{'S'}	{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}	{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}	{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}	{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}
	'trace_14'	{'Non'}{'Non'}{'Non'}{'Non'}{'Non'}{'Non'}{'Non'}	{'Non'}{'Non'}{'Non'}{'Non'}{'Non'}{'Non'}{'Non'}	{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}	{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}	{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}
	'trace_15'	{'Non'}{'Non'}{'Non'}{'Non'}{'S'}{'S'}{'S'}	{'Non'}{'Non'}{'Non'}{'Non'}{'Non'}{'Non'}{'Non'}	{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}	{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}	{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}
ion'})	ADF	{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}	{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}	{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}	{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}	{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}

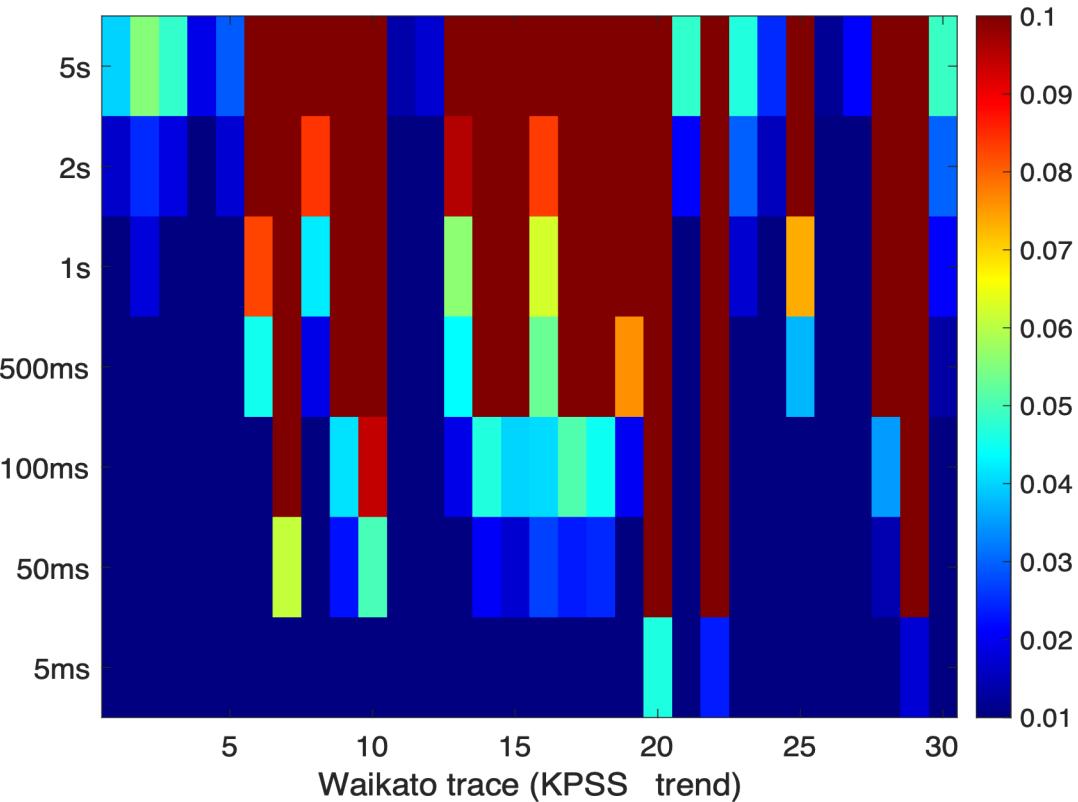
	'trace_16'	{'Non'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}
		{'Non'}{'Non'}{'Non'}{'Non'}{'Non'}{'Non'}{'Non'}{'Non'}
		{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}
		{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}
		{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}
	'trace_17'	
'trend'=false		{'Non'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}
'trend'=true		{'Non'}{'Non'}{'Non'}{'Non'}{'Non'}{'Non'}{'Non'}{'Non'}
		{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}
		{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}
		{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}
	'trace_18'	
		{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}
		{'Non'}{'Non'}{'Non'}{'Non'}{'Non'}{'Non'}{'Non'}{'Non'}
		{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}
		{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}
		{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}
	'trace_19'	
		{'Non'}{'Non'}{'Non'}{'Non'}{'Non'}{'Non'}{'Non'}{'Non'}
		{'Non'}{'Non'}{'Non'}{'Non'}{'Non'}{'Non'}{'Non'}{'Non'}
		{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}
		{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}
		{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}
	'trace_20'	
		{'Non'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}
		{'Non'}{'Non'}{'Non'}{'Non'}{'Non'}{'Non'}{'Non'}{'Non'}
		{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}
		{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}
		{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}{'S'}

Stationarity tests

Waikato Traces

- KPSS: p-value > 0.05 → stationary

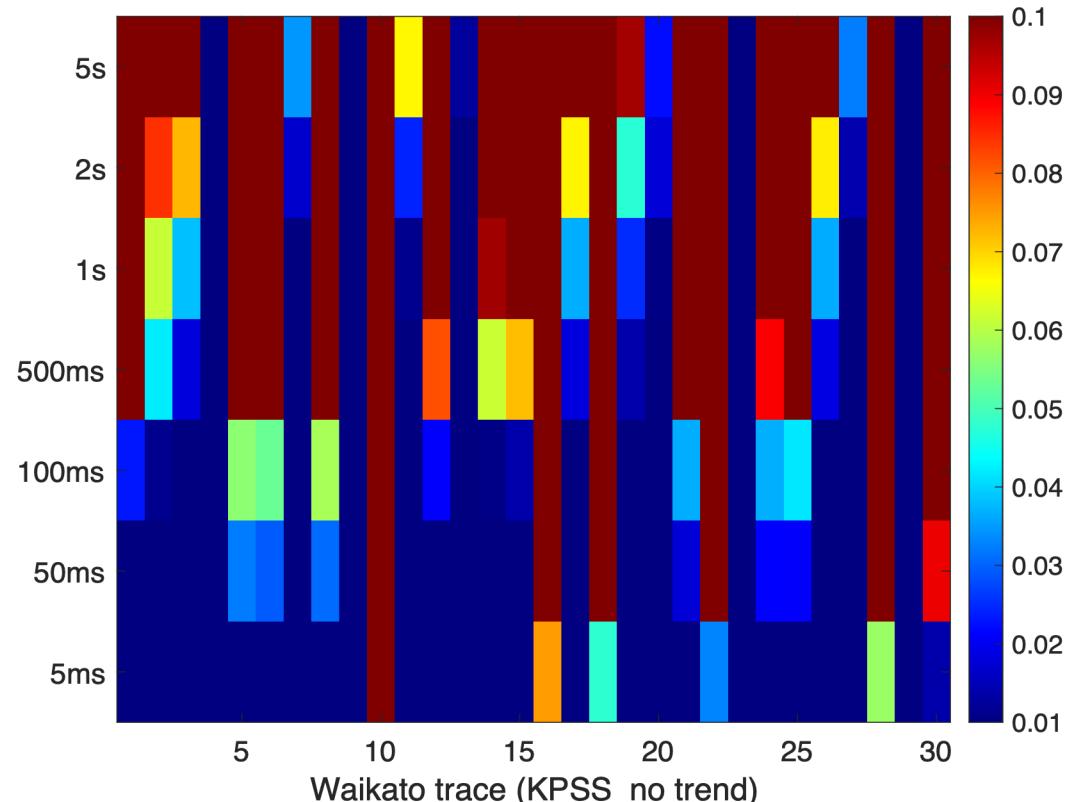
KPSS (trend = true)



Using the 'trend' option

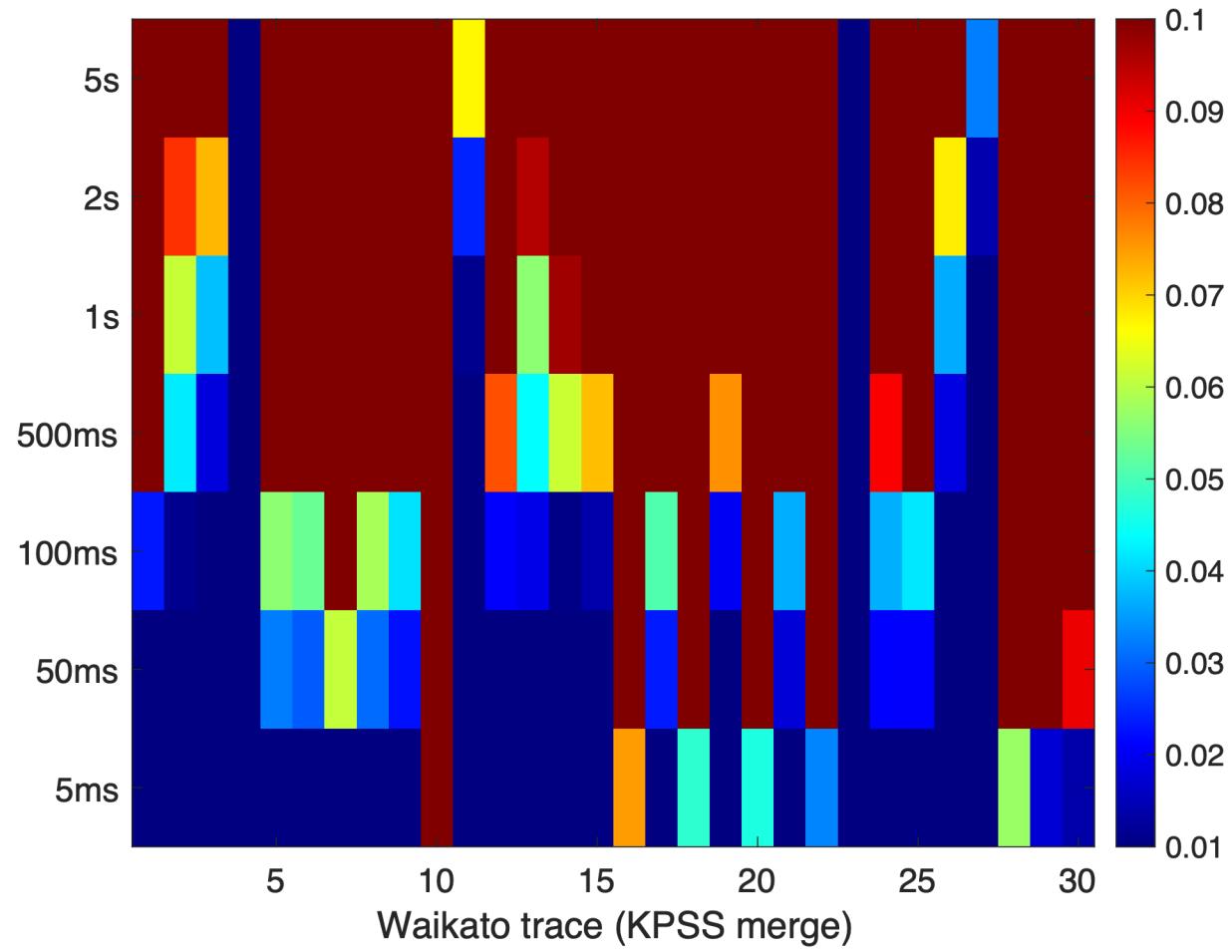


KPSS (trend = false)



Disabling the 'trend' option

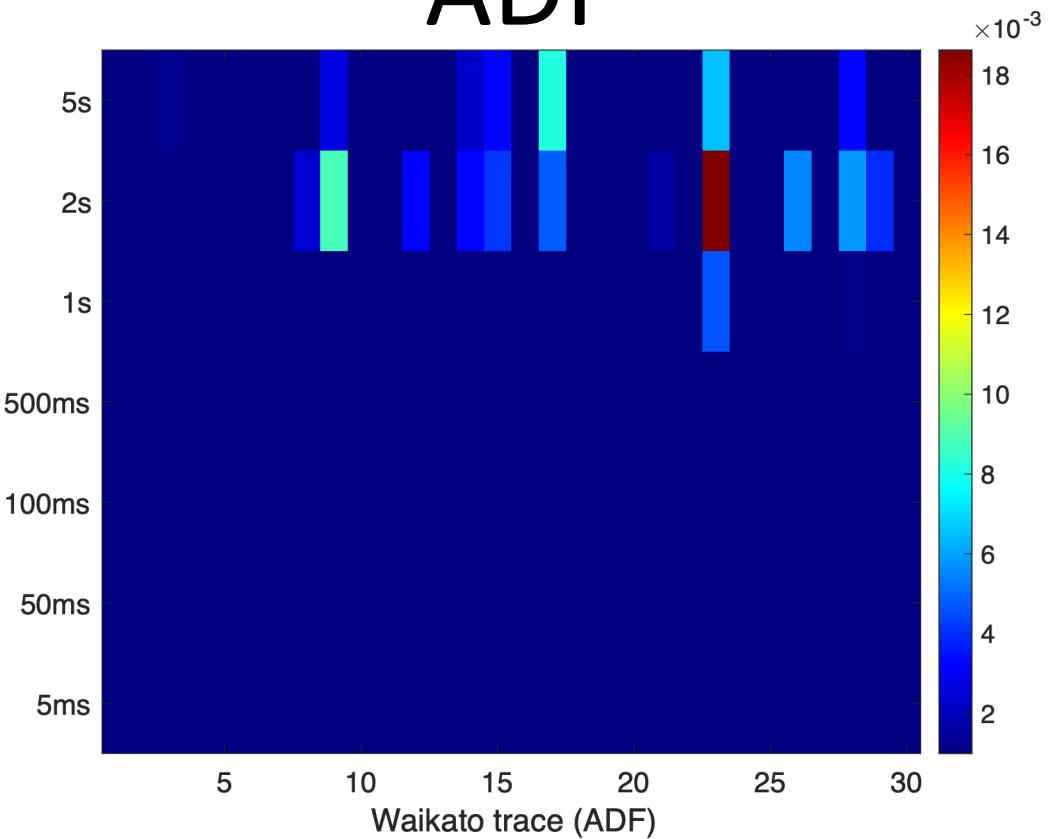




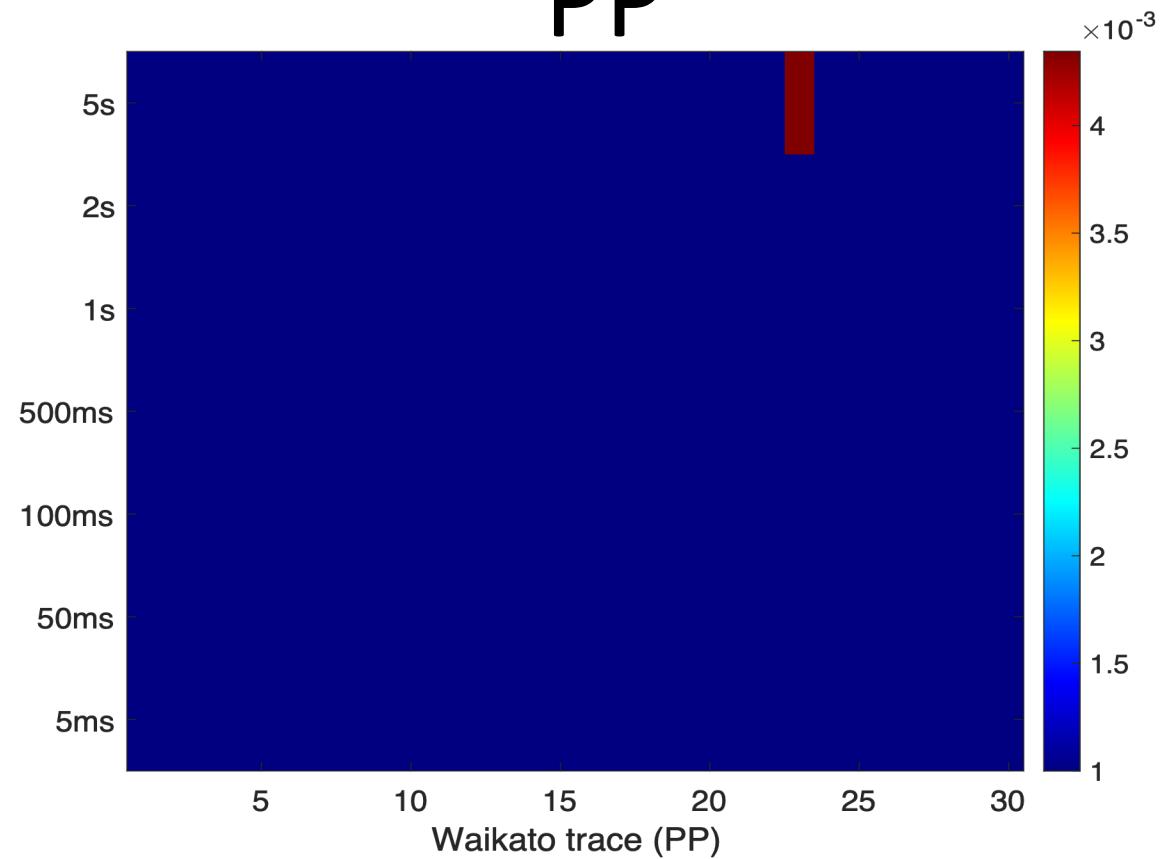
Waikato

- ADF&PP: p-value < 0.05 → stationary

ADF



PP

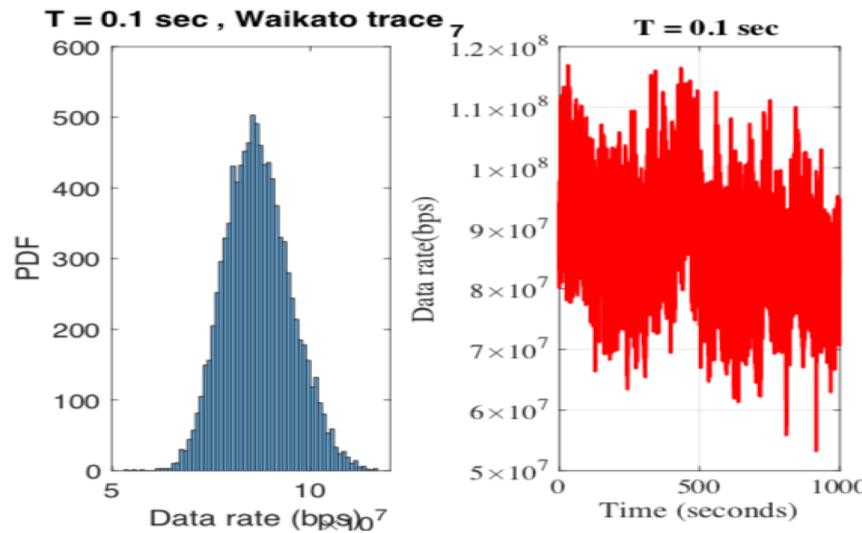


Waikato Examples: Trend only

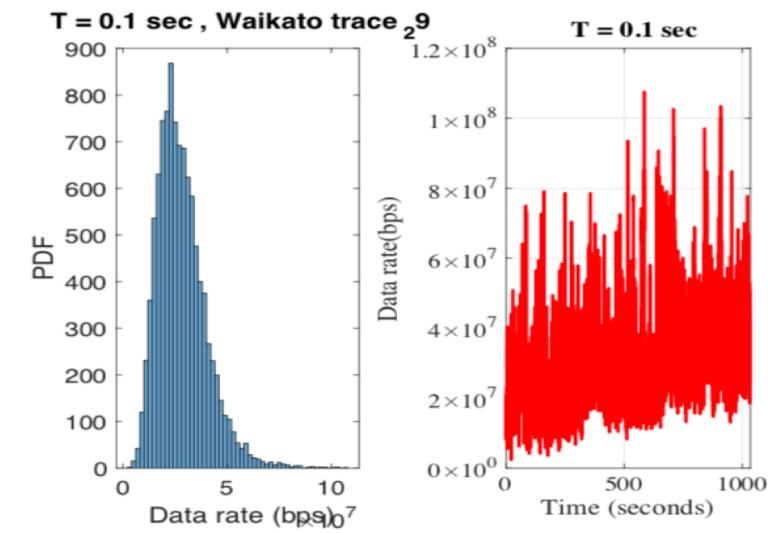
KPSS case 1

i.e., KPSS shows stationary when using ‘trend = true’ and shows non-stationary when using ‘trend = false’

Trend only



Trend only



{'5ms'} {'50ms'} {'100ms'} {'500ms'} {'1s'} {'2s'} {'5s'}

Kpss_non_trend_results	{'Non'}						
kpss_trend_results	{'Non'}	{'S' }					
kpss_diff_results	{'S' }						
adf_results	{'S' }						
pp_results	{'S' }						

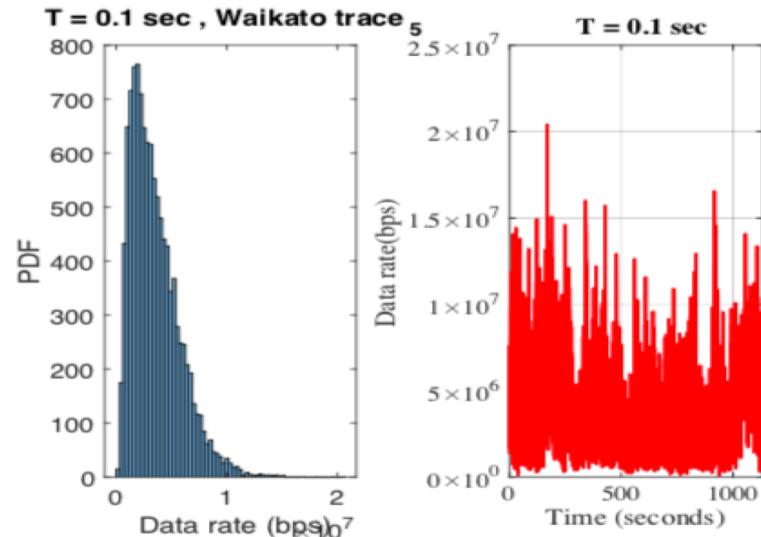
{'5ms'} {'50ms'} {'100ms'} {'500ms'} {'1s'} {'2s'} {'5s'}

{'Non'}						
{'Non'}	{'S' }					
{'S' }						
{'S' }						
{'S' }						

Waikato Examples: Non-trend only

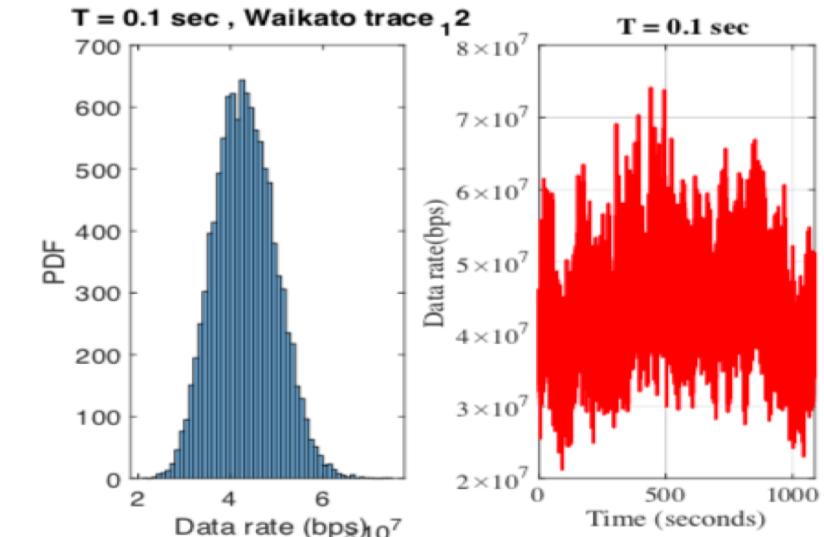
KPSS case 2

i.e., KPSS shows stationary when using 'trend = false' and shows non-stationary when using 'trend = true'



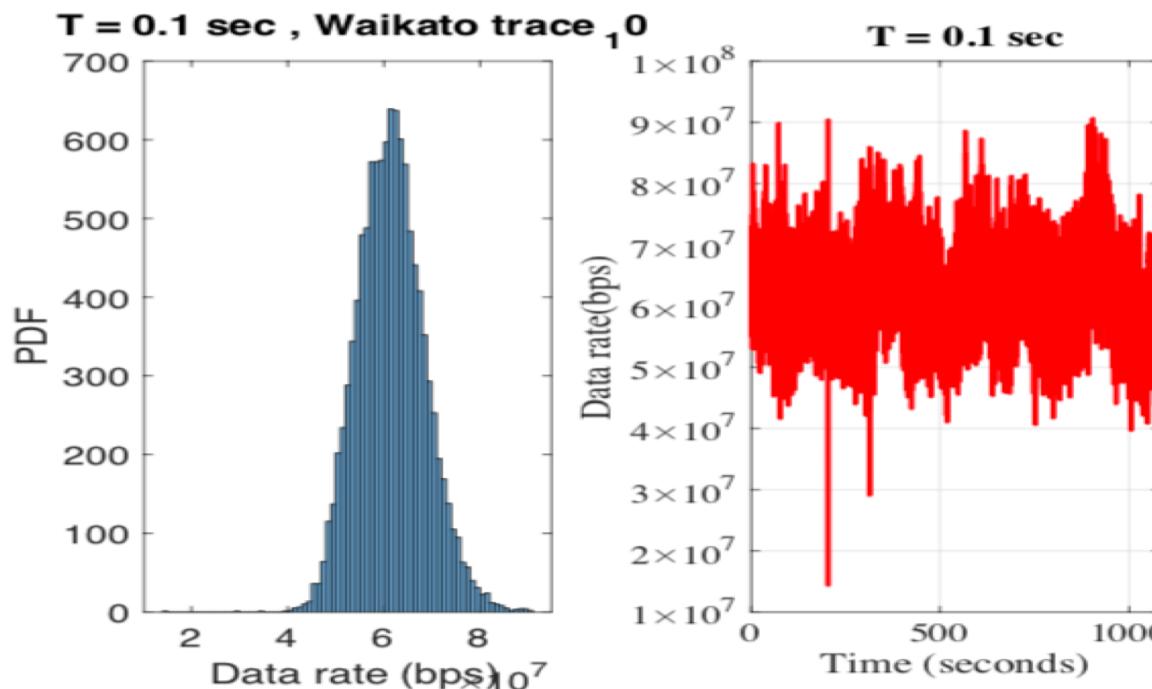
```
{'5ms'} {'50ms'} {'100ms'} {'500ms'} {'1s'} {'2s'} {'5s'} {'5ms'} {'50ms'} {'100ms'} {'500ms'} {'1s'} {'2s'} {'5s'}
```

Kpss_non_trend_results	{'Non'}	{'Non'}	{'S' }											
kpss_trend_results	{'Non'}													
kpss_diff_results	{'S' }													
adf_results	{'S' }													
pp_results	{'S' }													



```
{'Non'} {'Non'} {'Non'} {'S' } {'S' }
```

i.e., KPSS shows stationary when either using 'trend = false' or 'trend = true'



	{'5ms'}	{'50ms'}	{'100ms'}	{'500ms'}	{'1s'}	{'2s'}	{'5s'}
--	---------	----------	-----------	-----------	--------	--------	--------

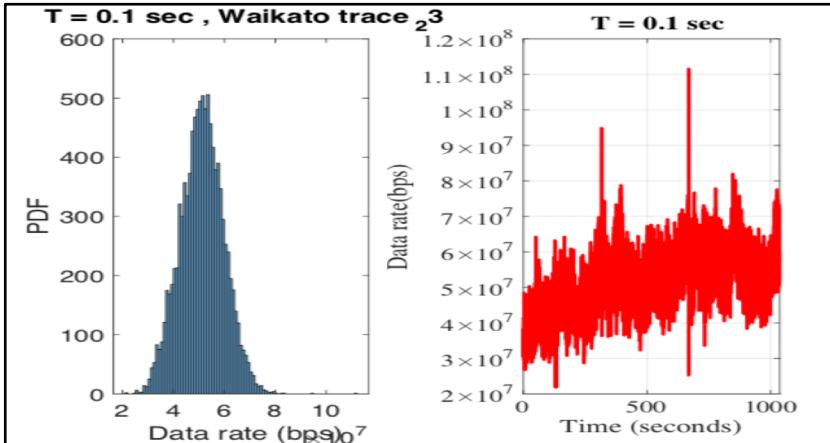
Kpss_non_trend_results	{'S' }	{'S'}	{'S'}	{'S'}	{'S'}	{'S'}	{'S'}
kpss_trend_results	{'Non'}	{'S'}	{'S'}	{'S'}	{'S'}	{'S'}	{'S'}
kpss_diff_results	{'S' }	{'S'}	{'S'}	{'S'}	{'S'}	{'S'}	{'S'}
adf_results	{'S' }	{'S'}	{'S'}	{'S'}	{'S'}	{'S'}	{'S'}
pp_results	{'S' }	{'S'}	{'S'}	{'S'}	{'S'}	{'S'}	{'S'}

Waikato Examples: Neither Trend nor non-trend at all T values

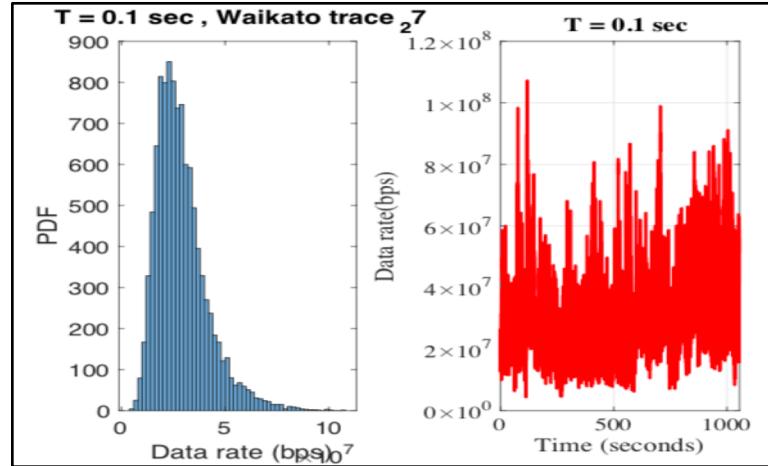
KPSS case 4

i.e., KPSS shows non-stationary when either using 'trend = false' or 'trend = true'

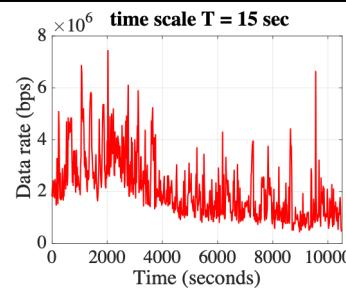
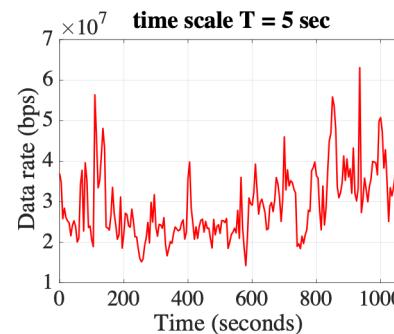
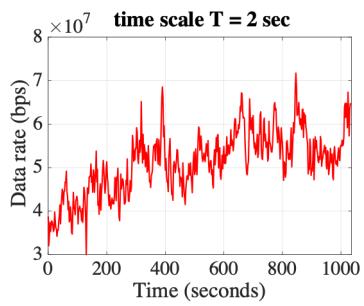
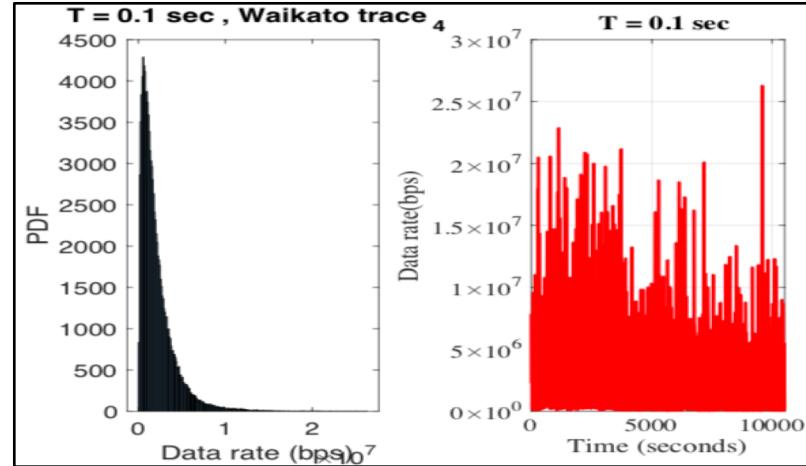
Trace 23



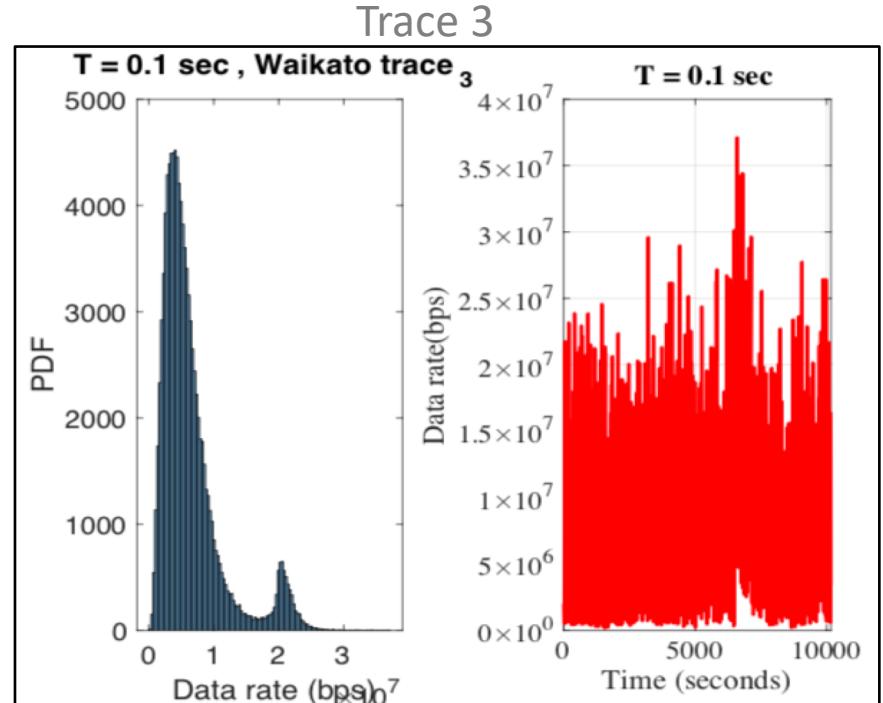
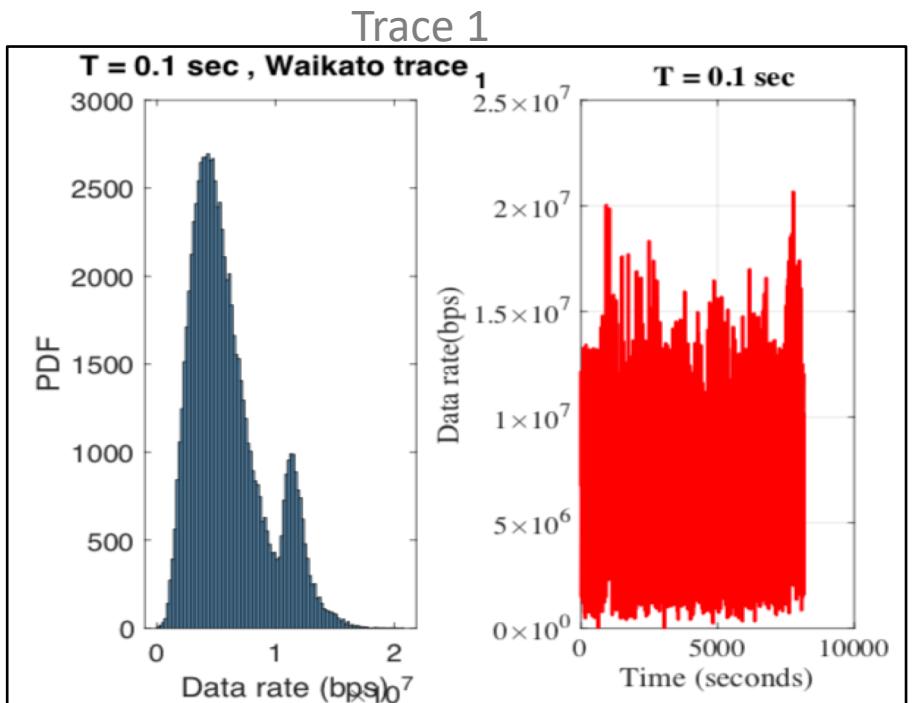
Trace 27



Trace 4



The Waikato anomalous traces (2/30)



trace1

Kpss_non_trend_results	{'Non'}	{'Non'}	{'Non'}	{'S' }	{'S' }	{'S' }	{'S' }
kpss_trend_results	{'Non'}						
kpss_diff_results	{'S' }						
adf_results	{'S' }						
pp_results	{'S' }						

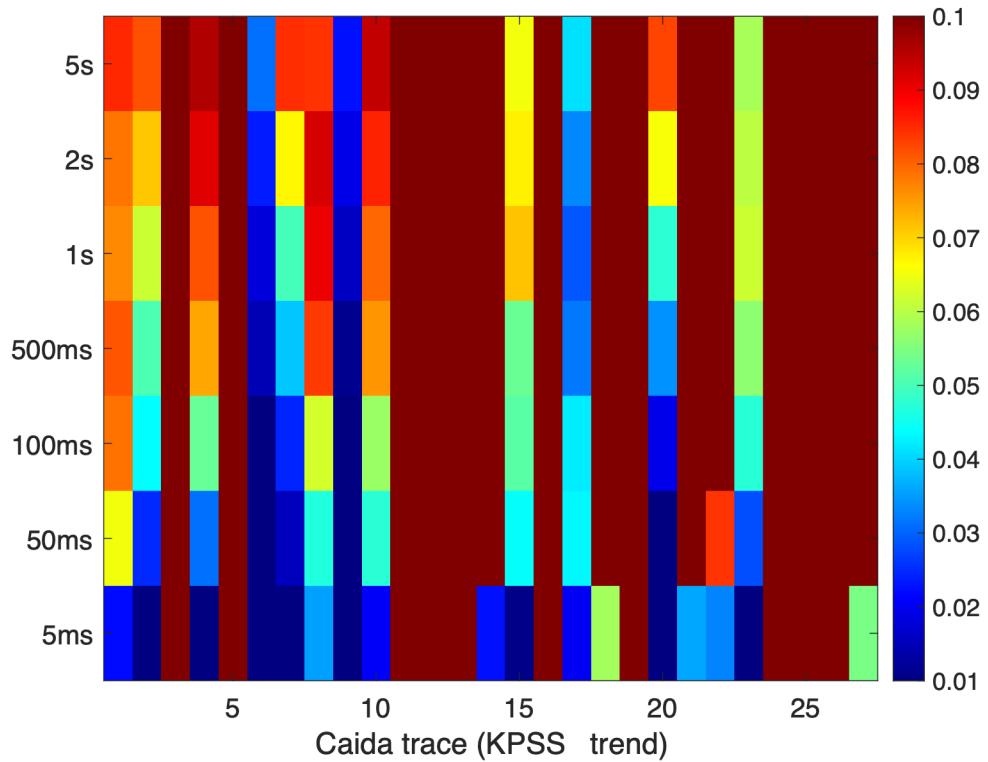
trace3

Kpss_non_trend_results	{'Non'}	{'Non'}	{'Non'}	{'Non'}	{'Non'}	{'S' }	{'S' }
kpss_trend_results	{'Non'}						
kpss_diff_results	{'S' }						
adf_results	{'S' }						
pp_results	{'S' }						

Stationarity tests

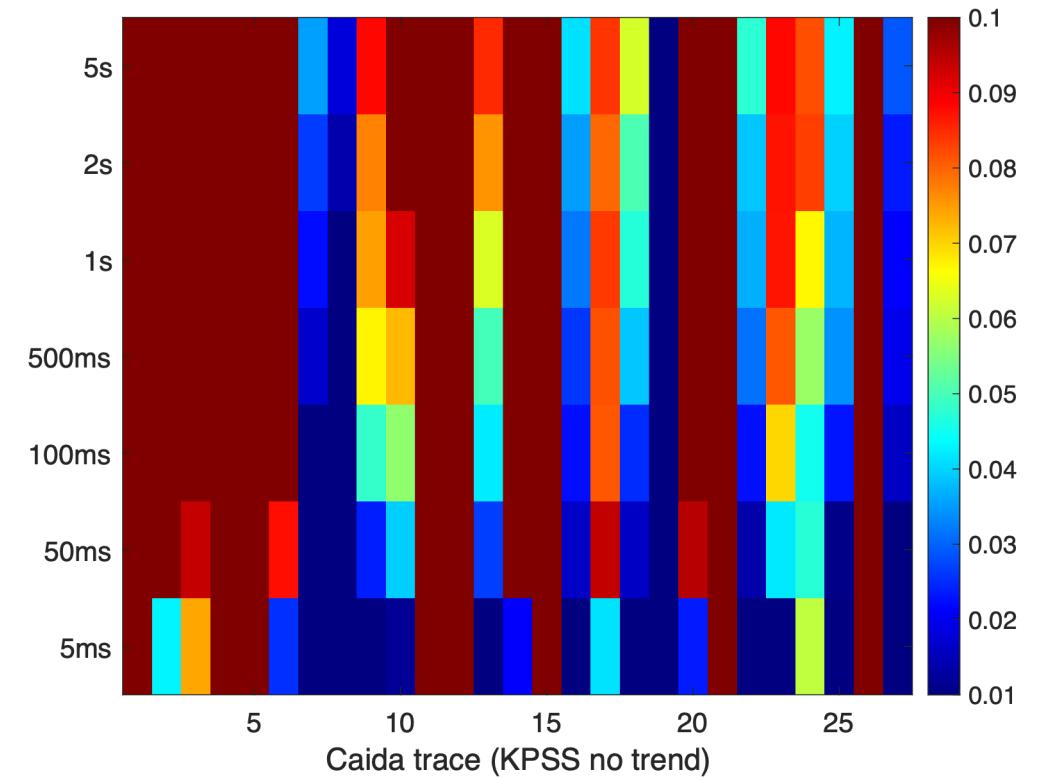
Caida Traces

KPSS (trend = true)



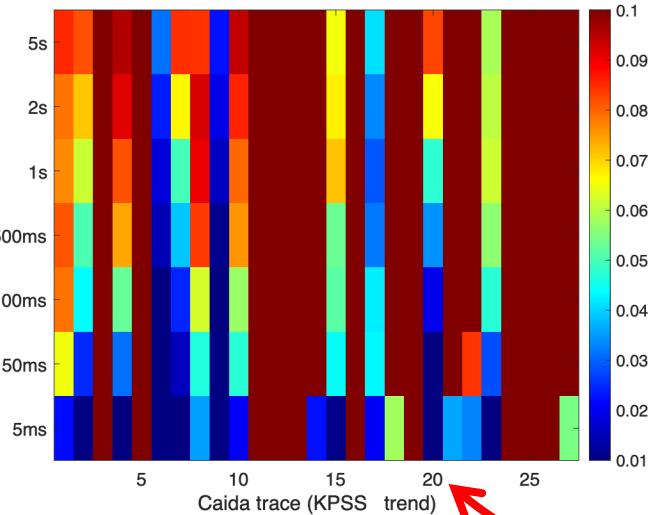
Using the 'trend' option

KPSS (trend = false)



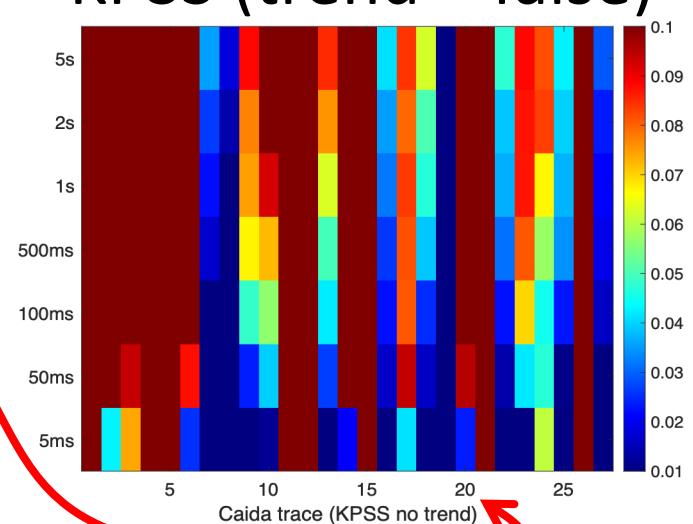
Disabling the 'trend' option

KPSS (trend = true)

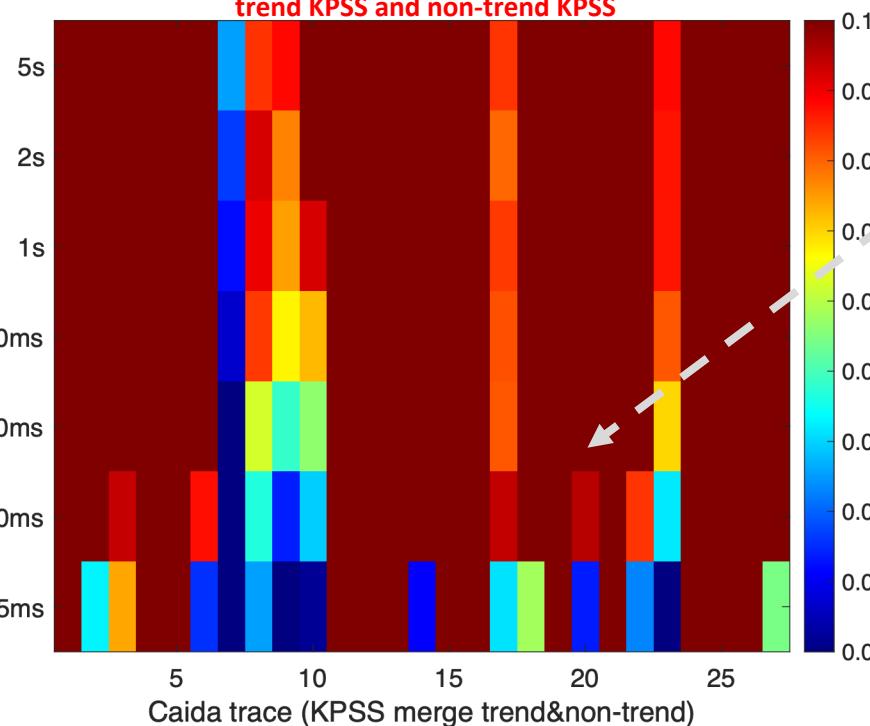


e.g., trace 20 is non-stationary (at most timescales) when using trend KPSS while it is stationary when using non-trend KPSS, so we pick the results of the non-trend KPSS for this trace.

KPSS (trend = false)



The combined (filtered) results between
trend KPSS and non-trend KPSS



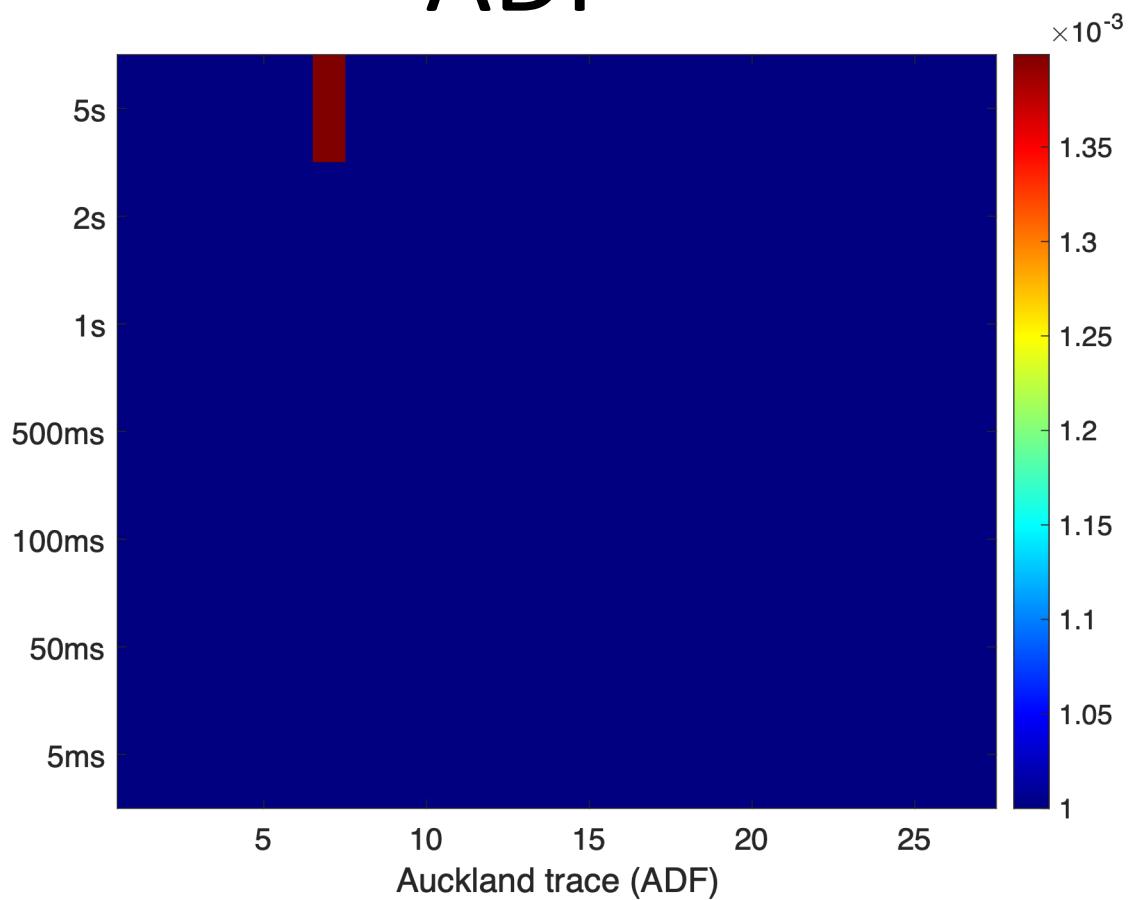
- The results when using KPSS ‘trend’ on 27 CAIDA traces: 9 traces are trend stationary

1. Trace 8
2. Trace 13
3. Trace 16
4. Trace 18
5. Trace 19
6. Trace 22
7. Trace 24
8. Trace 25
9. Trace 27

- While the other traces (18 traces) are stationary based on no-trend KPSS (they are no-trend stationary traces).

- ADF&PP: p-value < 0.05 → stationary

ADF



PP

All 0.001

KPSS neither
trend nor
non-trend
(1/28):
Trace 7

Trace 7

**KPSS trend
only (9/28):**

Trace 8
Trace 13
Trace 16
Trace 18
Trace 19
Trace 22
Trace 24
Trace 25
Trace 27

KPSS non-trend (18/28)

```
'trace_26'
{'S'} {'S'} {'S'} {'S'} {'S'} {'S'} {'S'}
```



```
'trace_27'
{'Non'} {'Non'} {'Non'} {'Non'} {'Non'} {'Non'} {'Non'}
{'S'} {'S'} {'S'} {'S'} {'S'} {'S'} {'S'}
{'S'} {'S'} {'S'} {'S'} {'S'} {'S'} {'S'}
{'S'} {"S"} {"S"} {"S"} {"S"} {"S"} {"S"}
{'S'} {"S"} {"S"} {"S"} {"S"} {"S"} {"S'}
```



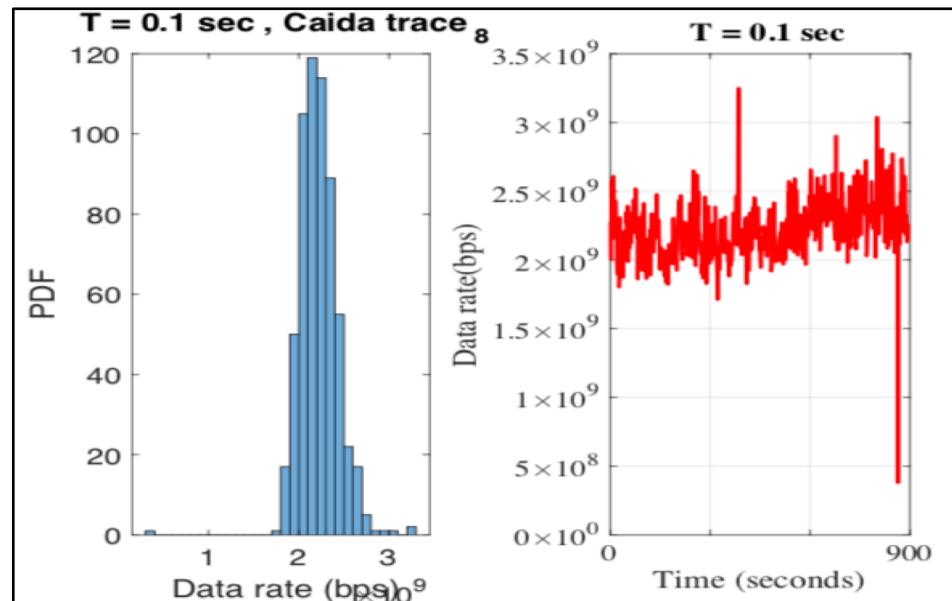
```
'trace_28'
{'Non'} {'S'} {'S'} {'S'} {'S'} {'S'} {'S'}
{'S'} {"S"} {"S"} {"S"} {"S"} {"S"} {"S'}
```

Caida Examples: KPSS Trend only

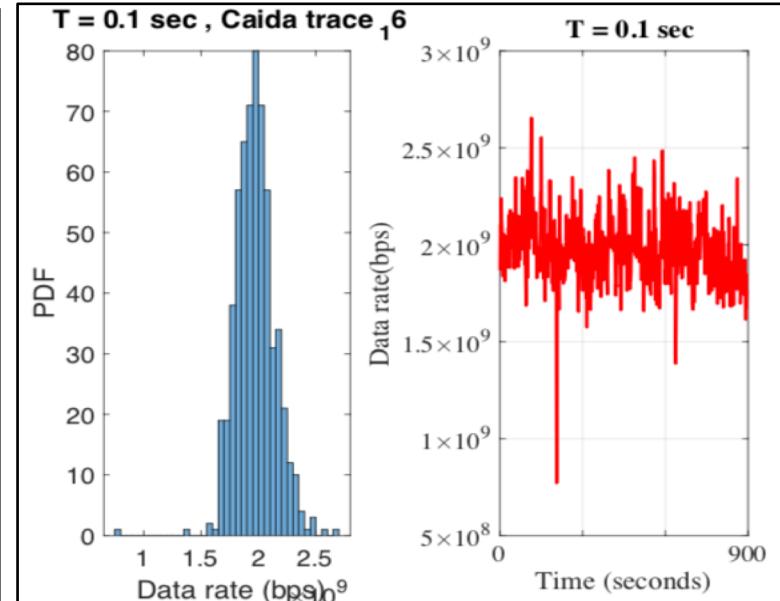
KPSS case 1

i.e., KPSS shows stationary when using ‘trend = true’ and shows non-stationary when using ‘trend = false’

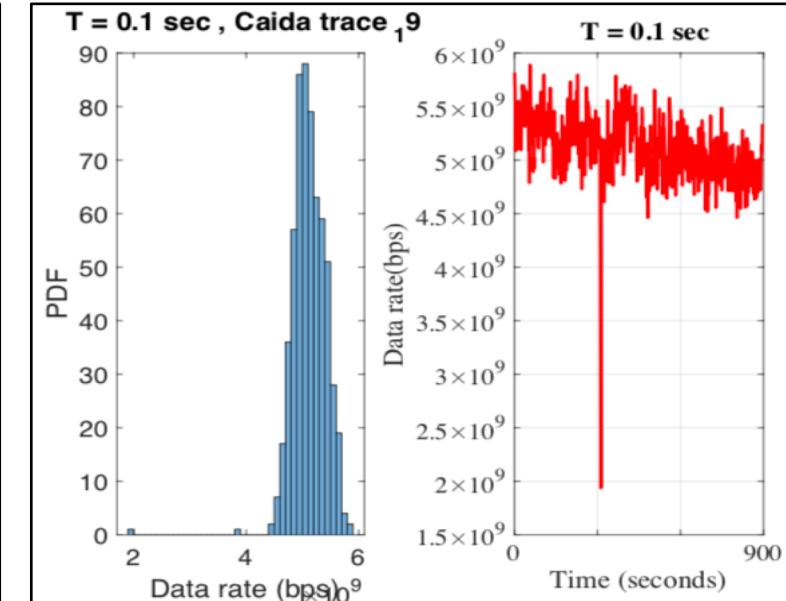
Trace 8



Trace 16



Trace 19

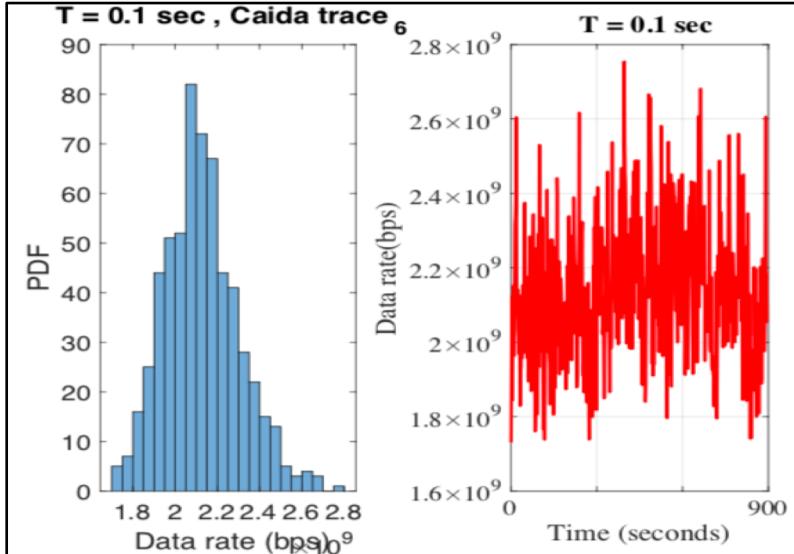


Caida Examples: Non-trend only

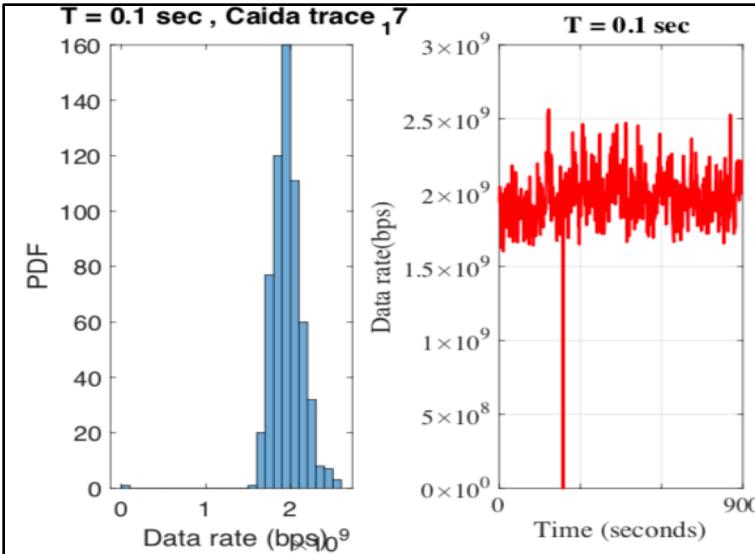
KPSS case 2

i.e., KPSS shows stationary when using 'trend = false' and shows non-stationary when using 'trend = true'

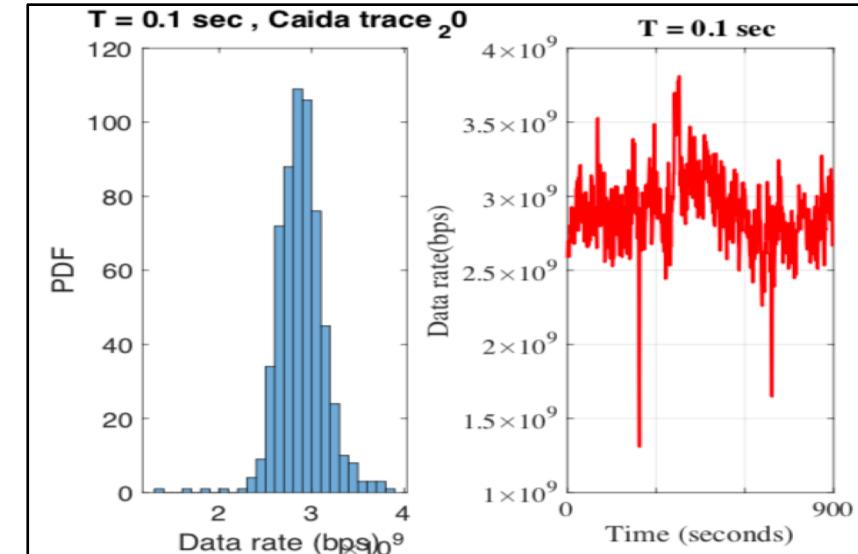
Trace 6



Trace 17



Trace 20

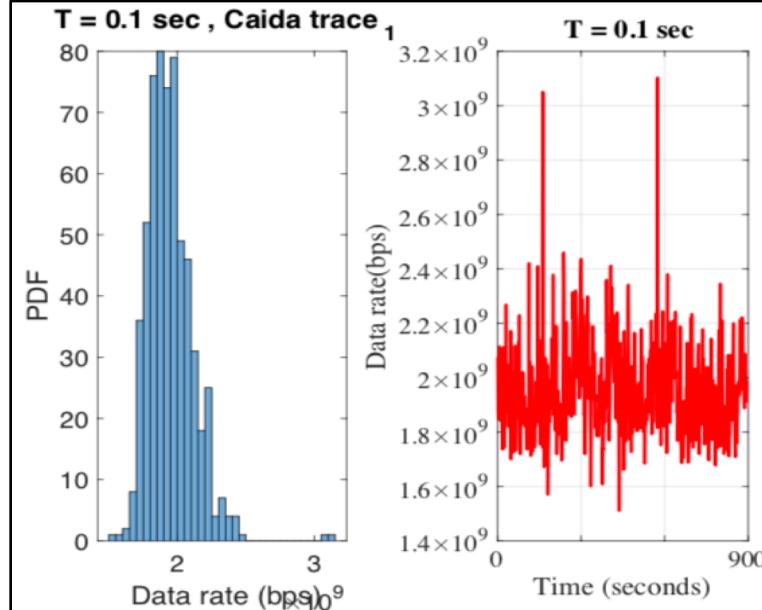


Caida Examples: Both Trend & non-trend

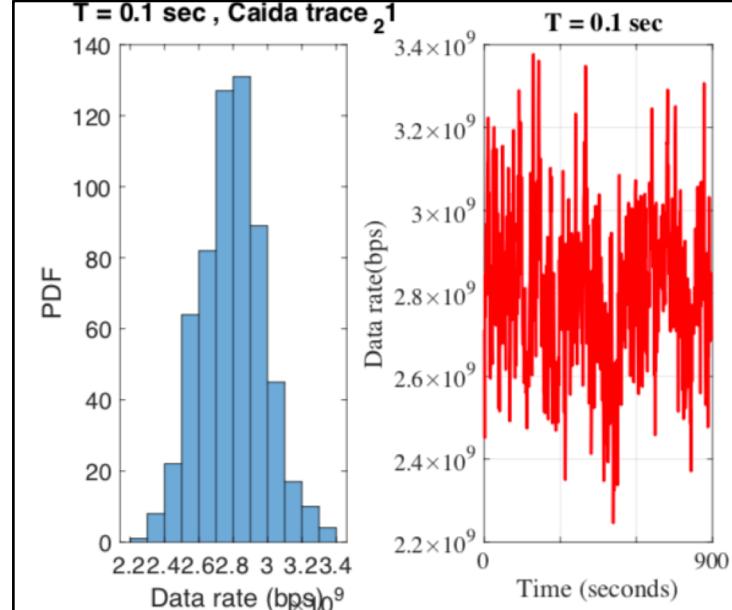
KPSS case 3

i.e., KPSS shows stationary when either using 'trend = false' or 'trend = true'

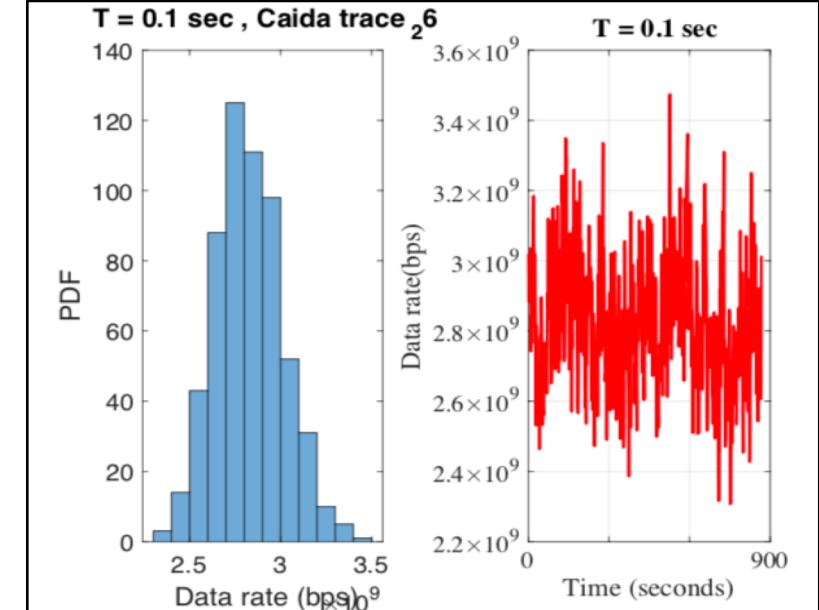
Trace 1



Trace 21



Trace 26



Twente Examples: Neither Trend nor non-trend at all T values

i.e., KPSS shows non-stationary when either using 'trend = false' or 'trend = true'

