

```
362 0 OUTPUT ACTIVATE CUSUMTestOutput.  
362 0 M> OUTPUT ACTIVATE CUSUMTestOutput.  
363 0 TITLE 'CUSUM Test'.  
363 0 M> TITLE 'CUSUM Test'.
```

CUSUMTest

```
364 0 GET DATA /TYPE=TXT /FILE='D:\DATA ANALYSIS\N Time Series Tests and Fo
recasting\CUSUM Test\dataset.csv' /ENCODING='UTF8' /DE
LCASE=LINE /DELIMITERS=', ' /QUALIFIER='"' /ARRANGEMENT=DELIMITED /
FIRSTCASE=2
364 0 M> GET DATA /TYPE=TXT /FILE='D:\DATA ANALYSIS\N Time Series Tests and
Forecasting\CUSUM Test\dataset.csv' /ENCODING='UTF8'
/DELCASE=LINE /DELIMITERS=', ' /QUALIFIER='"' /ARRANGEMENT=DELIM
ITED /FIRSTCASE=2
365 0 /VARIABLES=school A8 sex A8 age F8.0 address A8 famsize A8 Pstatus A
8 Medu F8.0 Fedu F8.0 Mjob A16 Fjob A16 reason A16 gua
rdian A16 traveltime F8.0 studytime F8.0 failures F8.0 schoolsup A
8 famsup A8 paid A8 activities A8 nursery A8 higher A8
internet A8 romantic A8 famrel F8.0 freetime F8.0 goout F8.0 Dalc
F8.0 Walc F8.0 health F8.0 absences F8.0 G1 F8.0 G2 F
8.0 G3 F8.0.
365 0 M> /VARIABLES=school A8 sex A8 age F8.0 address A8 famsize A8 Pstatu
s A8 Medu F8.0 Fedu F8.0 Mjob A16 Fjob A16 reason A16
guardian A16 traveltime F8.0 studytime F8.0 failures F8.0 schoo
lsup A8 famsup A8 paid A8 activities A8 nursery A8 hig
her A8 internet A8 romantic A8 famrel F8.0 freetime F8.0 goout
F8.0 Dalc F8.0 Walc F8.0 health F8.0 absences F8.0 G1
F8.0 G2 F8.0 G3 F8.0.
366 0 DATASET NAME CUSUMTestData.
366 0 M> DATASET NAME CUSUMTestData.
367 0 COMPUTE time_index=$CASENUM.
367 0 M> COMPUTE time_index=$CASENUM.
368 0 EXECUTE.
368 0 M> EXECUTE.
369 0 * BEGIN METHOD-SPECIFIC SPSS WORKFLOW.
369 0 M> * BEGIN METHOD-SPECIFIC SPSS WORKFLOW.
370 0 REGRESSION /STATISTICS=COEFF OUTS R ANOVA CI(95) /DEPENDENT G3 /METHO
D=ENTER time_index /SAVE RESID(cusum_resid).
370 0 M> REGRESSION /STATISTICS=COEFF OUTS R ANOVA CI(95) /DEPENDENT G3 /ME
THOD=ENTER time_index /SAVE RESID(cusum_resid).
```

Regression

CUSUMTest

Notes

Output Created		18-JUL-2026 15:51:29
Comments		
Input	Data	D:\DATA ANALYSIS\N Time Series Tests and Forecasting\CUSUM Test\dataset.csv
	Active Dataset	CUSUMTestData
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	649
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /STATISTICS=COEFF OUTS R ANOVA CI(95) /DEPENDENT G3 /METHOD=ENTER time_index /SAVE RESID (cusum_resid).
Resources	Processor Time	00:00:00.16
	Elapsed Time	00:00:01.29
	Memory Required	3840 bytes
	Additional Memory Required for Residual Plots	0 bytes
Variables Created or Modified	cusum_resid	Unstandardized Residual

[CUSUMTestData]

CUSUMTest

Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
1	time_index ^b	.	Enter

a. Dependent Variable: G3

b. All requested variables entered.

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.177 ^a	.031	.030	3.182

a. Predictors: (Constant), time_index

b. Dependent Variable: G3

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	211.509	1	211.509	20.887	.000 ^b
	Residual	6551.757	647	10.126		
	Total	6763.267	648			

a. Dependent Variable: G3

b. Predictors: (Constant), time_index

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	12.896	.250		51.562	.000
	time_index	-.003	.001	-.177	-4.570	.000

CUSUMTest

Coefficients^a

Model		95.0% Confidence Interval for B	
		Lower Bound	Upper Bound
1	(Constant)	12.405	13.387
	time_index	-.004	-.002

a. Dependent Variable: G3

Residuals Statistics^a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	10.92	12.89	11.91	.571	649
Residual	-12.397	8.045	.000	3.180	649
Std. Predicted Value	-1.728	1.728	.000	1.000	649
Std. Residual	-3.896	2.528	.000	.999	649

a. Dependent Variable: G3

```

371  0  COMPUTE scaled_resid=cusum_resid/4.0.
371  0  M>  COMPUTE scaled_resid=cusum_resid/4.0.
372  0  CREATE cusum=CSUM(scaled_resid).
372  0  M>  CREATE cusum=CSUM(scaled_resid).

```

Create

CUSUMTest

Notes

Output Created		18-JUL-2026 15:51:30
Comments		
Input	Data	D:\DATA ANALYSIS\N Time Series Tests and Forecasting\CUSUM Test\dataset.csv
	Active Dataset	CUSUMTestData
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	649
	Date	<none>
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	All non-missing data are used.
Syntax		CREATE cusum=CSUM (scaled_resid).
Resources	Processor Time	00:00:00.14
	Elapsed Time	00:00:00.55
Time Series Settings (TSET)	Treatment of User-Missing Values	User-defined missing values are treated as missing.
	Length of Seasonal Period	Unspecified

Created Series

	Series Name	Case Number of Non-Missing Values		N of Valid Cases	Creating Function
		First	Last		
1	cusum	1	649	649	CSUM (scaled_resid)

```

373 0 DESCRIPTIVES VARIABLES=cusum /STATISTICS=MEAN STDDEV MIN MAX.
373 0 M> DESCRIPTIVES VARIABLES=cusum /STATISTICS=MEAN STDDEV MIN MAX.

```

CUSUMTest

Descriptives

Notes

Output Created		18-JUL-2026 15:51:31
Comments		
Input	Data	D:\DATA ANALYSIS\N Time Series Tests and Forecasting\CUSUM Test\dataset.csv
	Active Dataset	CUSUMTestData
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	649
Missing Value Handling	Definition of Missing	User defined missing values are treated as missing.
	Cases Used	All non-missing data are used.
Syntax		DESCRIPTIVES VARIABLES=cusum /STATISTICS=MEAN STDDEV MIN MAX.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.43

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
CSUM(scaled_resid)	649	-32.01	35.28	.0000	19.18925
Valid N (listwise)	649				

```

374 0 * END METHOD-SPECIFIC SPSS WORKFLOW.
374 0 M> * END METHOD-SPECIFIC SPSS WORKFLOW.
375 0 SAVE OUTFILE='D:\DATA ANALYSIS\N Time Series Tests and Forecasting\CUSUM Test\SPSS_Output\sav\cusum-test_spss_ready_data.sav' /COMPRESSED.
375 0 M> SAVE OUTFILE='D:\DATA ANALYSIS\N Time Series Tests and Forecasting\CUSUM Test\SPSS_Output\sav\cusum-test_spss_ready_data

```

CUSUMTest

```
.sav' /COMPRESSED.
376 0 ECHO 'CUSUM Test'.
376 0 M> ECHO 'CUSUM Test'.
CUSUM Test
377 0 ECHO 'Method type: hypothesis_test'.
377 0 M> ECHO 'Method type: hypothesis_test'.
Method type: hypothesis_test
378 0 ECHO 'Design: OLS-residual CUSUM stability test for the linear G3 trend.'.
378 0 M> ECHO 'Design: OLS-residual CUSUM stability test for the linear G3 trend.'.
Design: OLS-residual CUSUM stability test for the linear G3 trend.
379 0 ECHO 'Formula: CUSUM_t=sum(e_i)/(s*sqrt(n)); compare sup|CUSUM| to Brownian-bridge limits'.
379 0 M> ECHO 'Formula: CUSUM_t=sum(e_i)/(s*sqrt(n)); compare sup|CUSUM| to Brownian-bridge limits'.
Formula: CUSUM_t=sum(e_i)/(s*sqrt(n)); compare sup|CUSUM| to Brownian-bridge limits
380 0 ECHO 'Series order: source-row order'.
380 0 M> ECHO 'Series order: source-row order'.
Series order: source-row order
381 0 ECHO 'cusum_supremum = 1.7407343266211492'.
381 0 M> ECHO 'cusum_supremum = 1.7407343266211492'.
cusum_supremum = 1.7407343266211492
382 0 ECHO 'p_value = 0.004667345315287488'.
382 0 M> ECHO 'p_value = 0.004667345315287488'.
p_value = 0.004667345315287488
383 0 ECHO 'critical_1_percent = 1.63'.
383 0 M> ECHO 'critical_1_percent = 1.63'.
critical_1_percent = 1.63
384 0 ECHO 'critical_5_percent = 1.36'.
384 0 M> ECHO 'critical_5_percent = 1.36'.
critical_5_percent = 1.36
385 0 ECHO 'critical_10_percent = 1.22'.
385 0 M> ECHO 'critical_10_percent = 1.22'.
critical_10_percent = 1.22
386 0 ECHO 'n_residuals = 649'.
386 0 M> ECHO 'n_residuals = 649'.
n_residuals = 649
```

CUSUMTest

```
387 0 ECHO 'Cross-check status: pass'.
387 0 M> ECHO 'Cross-check status: pass'.
Cross-check status: pass
388 0 OUTPUT SAVE OUTFILE='D:\DATA ANALYSIS\N Time Series Tests and Forecas
ting\CUSUM Test\SPSS_Output\spv\cusum-test_spss_output
.spv'.
388 0 M> OUTPUT SAVE OUTFILE='D:\DATA ANALYSIS\N Time Series Tests and Fore
casting\CUSUM Test\SPSS_Output\spv\cusum-test_spss_out
put.spv'.
389 0 OUTPUT EXPORT /CONTENTS EXPORT=ALL LAYERS=PRINTSETTING MODELVIEWS=PRI
NTSETTING /PDF DOCUMENTFILE='D:\DATA ANALYSIS\N Time S
eries Tests and Forecasting\CUSUM Test\SPSS_Output\pdf\cusum-test_
spss_output.pdf'.
389 0 M> OUTPUT EXPORT /CONTENTS EXPORT=ALL LAYERS=PRINTSETTING MODELVIEWS=
PRINTSETTING /PDF DOCUMENTFILE='D:\DATA ANALYSIS\N Tim
e Series Tests and Forecasting\CUSUM Test\SPSS_Output\pdf\cusum
-test_spss_output.pdf'.
```