

# Wilcoxon Signed Ranks test.

KEEL non-parametric statistical module

January 15, 2017

## 1 Detailed results for SVRCC

### 1.1 Results

VS	$R^+$	$R^-$	Exact P-value	Asymptotic P-value
MORF	224.0	76.0	0.03398	0.03329
ST	239.0	61.0	0.009576	0.010554
MTS	242.0	58.0	0.00719	0.008221
MTSC	238.0	62.0	0.010508	0.011453
RC	250.0	50.0	0.003144	0.004086
ERC	229.0	71.0	0.02294	0.023121
ERCC	221.0	79.0	0.04248	0.041067
SVR	297.0	3.0	5.96E-7	0.000022
SVRRC	266.5	33.5	4.013E-4	0.00076

Table 1: Results obtained by the Wilcoxon test for algorithm SVRCC

### 1.2 Confidence intervals for Median of differences

$\alpha=0.90$	Confidence interval	Exact confidence
MORF	[0.0053 , 0.03665]	0.9049
ST	[0.00895 , 0.04445]	0.9049
MTS	[0.0102 , 0.05025]	0.9049
MTSC	[0.0086 , 0.05145]	0.9049
RC	[0.01315 , 0.0553]	0.9049
ERC	[0.0074 , 0.04605]	0.9049
ERCC	[0.004 , 0.0431]	0.9049
SVR	[0.00625 , 0.0134]	0.9049
SVRRC	[0.0017 , 0.0063]	0.9049

Table 2: Confidence intervals for algorithm SVRCC ( $\alpha=0.90$ )

$\alpha=0.95$	Confidence interval	Exact confidence
MORF	[0.0024 , 0.0397]	0.95094
ST	[0.0067 , 0.04955]	0.95094
MTS	[0.0076 , 0.05605]	0.95094
MTSC	[0.0062 , 0.0549]	0.95094
RC	[0.0114 , 0.0582]	0.95094
ERC	[0.0042 , 0.0515]	0.95094
ERCC	[0.0011 , 0.04755]	0.95094
SVR	[0.00535 , 0.01395]	0.95094
SVRRC	[0.0016 , 0.00735]	0.95094

Table 3: Confidence intervals for algorithm SVRCC ( $\alpha=0.95$ )

## 2 Detailed results for MORF

### 2.1 Results

VS	$R^+$	$R^-$	Exact P-value	Asymptotic P-value
SVRCC	76.0	224.0	$\geq 0.2$	1
ST	151.0	149.0	$\geq 0.2$	0.965815
MTS	191.0	109.0	$\geq 0.2$	0.23406
MTSC	171.5	128.5	$\geq 0.2$	0.528155
RC	190.0	110.0	$\geq 0.2$	0.247214
ERC	151.0	149.0	$\geq 0.2$	0.965815
ERCC	130.0	170.0	$\geq 0.2$	1
SVR	105.0	195.0	$\geq 0.2$	1
SVRRC	97.0	203.0	$\geq 0.2$	1

Table 4: Results obtained by the Wilcoxon test for algorithm MORF

### 2.2 Confidence intervals for Median of differences

$\alpha=0.90$	Confidence interval	Exact confidence
SVRCC	[-0.03665 , -0.0053]	0.9049
ST	[-0.00895 , 0.01085]	0.9049
MTS	[-0.00195 , 0.016]	0.9049
MTSC	[-0.0063 , 0.01745]	0.9049
RC	[-0.0037 , 0.0211]	0.9049
ERC	[-0.00865 , 0.00995]	0.9049
ERCC	[-0.0114 , 0.00825]	0.9049
SVR	[-0.0245 , 0.00555]	0.9049
SVRRC	[-0.0305 , 0.0012]	0.9049

Table 5: Confidence intervals for algorithm MORF ( $\alpha=0.90$ )

$\alpha=0.95$	Confidence interval	Exact confidence
SVRCC	[-0.0397 , -0.0024]	0.95094
ST	[-0.00995 , 0.0133]	0.95094
MTS	[-0.00335 , 0.0179]	0.95094
MTSC	[-0.0073 , 0.0191]	0.95094
RC	[-0.0055 , 0.0263]	0.95094
ERC	[-0.00965 , 0.0121]	0.95094
ERCC	[-0.0124 , 0.01105]	0.95094
SVR	[-0.02835 , 0.0096]	0.95094
SVRRC	[-0.035 , 0.00575]	0.95094

Table 6: Confidence intervals for algorithm MORF ( $\alpha=0.95$ )

### 3 Detailed results for ST

#### 3.1 Results

VS	$R^+$	$R^-$	Exact P-value	Asymptotic P-value
SVRCC	61.0	239.0	$\geq 0.2$	1
MORF	149.0	151.0	$\geq 0.2$	1
MTS	166.0	134.0	$\geq 0.2$	0.634915
MTSC	171.0	105.0	$\geq 0.2$	0.304558
RC	224.0	76.0	0.03398	0.03329
ERC	143.5	156.5	$\geq 0.2$	1
ERCC	97.0	203.0	$\geq 0.2$	1
SVR	94.5	205.5	$\geq 0.2$	1
SVRRC	76.0	224.0	$\geq 0.2$	1

Table 7: Results obtained by the Wilcoxon test for algorithm ST

#### 3.2 Confidence intervals for Median of differences

$\alpha=0.90$	Confidence interval	Exact confidence
SVRCC	[-0.04445 , -0.00895]	0.9049
MORF	[-0.01085 , 0.00895]	0.9049
MTS	[-0.003 , 0.00885]	0.9049
MTSC	[-0.00045 , 0.00565]	0.9049
RC	[0.00065 , 0.00885]	0.9049
ERC	[-0.0053 , 0.0016]	0.9049
ERCC	[-0.00455 , 0.00025]	0.9049
SVR	[-0.03035 , 0.00075]	0.9049
SVRRC	[-0.03635 , -0.0048]	0.9049

Table 8: Confidence intervals for algorithm ST ( $\alpha=0.90$ )

$\alpha=0.95$	Confidence interval	Exact confidence
SVRCC	[-0.04955 , -0.0067]	0.95094
MORF	[-0.0133 , 0.00995]	0.95094
MTS	[-0.0037 , 0.01075]	0.95094
MTSC	[-0.0009 , 0.0065]	0.95094
RC	[0.0003 , 0.0102]	0.95094
ERC	[-0.00595 , 0.00235]	0.95094
ERCC	[-0.0069 , 0.00115]	0.95094
SVR	[-0.0362 , 0.00385]	0.95094
SVRRC	[-0.0417 , -0.0019]	0.95094

Table 9: Confidence intervals for algorithm ST ( $\alpha=0.95$ )

## 4 Detailed results for MTS

### 4.1 Results

VS	$R^+$	$R^-$	Exact P-value	Asymptotic P-value
SVRCC	58.0	242.0	$\geq 0.2$	1
MORF	109.0	191.0	$\geq 0.2$	1
ST	134.0	166.0	$\geq 0.2$	1
MTSC	152.0	148.0	$\geq 0.2$	0.943057
RC	188.0	112.0	$\geq 0.2$	0.271332
ERC	107.5	168.5	$\geq 0.2$	1
ERCC	107.0	193.0	$\geq 0.2$	1
SVR	88.0	212.0	$\geq 0.2$	1
SVRRC	75.0	225.0	$\geq 0.2$	1

Table 10: Results obtained by the Wilcoxon test for algorithm MTS

### 4.2 Confidence intervals for Median of differences

$\alpha=0.90$	Confidence interval	Exact confidence
SVRCC	[-0.05025 , -0.0102]	0.9049
MORF	[-0.016 , 0.00195]	0.9049
ST	[-0.00885 , 0.003]	0.9049
MTSC	[-0.00505 , 0.00555]	0.9049
RC	[-0.0032 , 0.00815]	0.9049
ERC	[-0.0104 , 0.0015]	0.9049
ERCC	[-0.00915 , 0.00225]	0.9049
SVR	[-0.0384 , -0.00175]	0.9049
SVRRC	[-0.04595 , -0.006]	0.9049

Table 11: Confidence intervals for algorithm MTS ( $\alpha=0.90$ )

$\alpha=0.95$	Confidence interval	Exact confidence
SVRCC	[-0.05605 , -0.0076]	0.95094
MORF	[-0.0179 , 0.00335]	0.95094
ST	[-0.01075 , 0.0037]	0.95094
MTSC	[-0.00605 , 0.0071]	0.95094
RC	[-0.0059 , 0.0104]	0.95094
ERC	[-0.01205 , 0.00205]	0.95094
ERCC	[-0.0108 , 0.0027]	0.95094
SVR	[-0.0426 , 0.0015]	0.95094
SVRRC	[-0.0488 , -0.0021]	0.95094

Table 12: Confidence intervals for algorithm MTS ( $\alpha=0.95$ )

## 5 Detailed results for MTSC

### 5.1 Results

VS	$R^+$	$R^-$	Exact P-value	Asymptotic P-value
SVRCC	62.0	238.0	$\geq 0.2$	1
MORF	128.5	171.5	$\geq 0.2$	1
ST	105.0	171.0	$\geq 0.2$	1
MTS	148.0	152.0	$\geq 0.2$	1
RC	174.0	126.0	$\geq 0.2$	0.482362
ERC	83.5	192.5	$\geq 0.2$	1
ERCC	31.0	245.0	$\geq 0.2$	1
SVR	92.0	208.0	$\geq 0.2$	1
SVRRC	76.0	224.0	$\geq 0.2$	1

Table 13: Results obtained by the Wilcoxon test for algorithm MTSC

### 5.2 Confidence intervals for Median of differences

$\alpha=0.90$	Confidence interval	Exact confidence
SVRCC	[-0.05145 , -0.0086]	0.9049
MORF	[-0.01745 , 0.0063]	0.9049
ST	[-0.00565 , 0.00045]	0.9049
MTS	[-0.00555 , 0.00505]	0.9049
RC	[-0.0045 , 0.0054]	0.9049
ERC	[-0.0108 , 0]	0.9049
ERCC	[-0.00725 , -0.0014]	0.9049
SVR	[-0.041 , 0.00025]	0.9049
SVRRC	[-0.04825 , -0.0059]	0.9049

Table 14: Confidence intervals for algorithm MTSC ( $\alpha=0.90$ )

$\alpha=0.95$	Confidence interval	Exact confidence
SVRCC	[-0.0549 , -0.0062]	0.95094
MORF	[-0.0191 , 0.0073]	0.95094
ST	[-0.0065 , 0.0009]	0.95094
MTS	[-0.0071 , 0.00605]	0.95094
RC	[-0.0066 , 0.0065]	0.95094
ERC	[-0.01165 , 0.0002]	0.95094
ERCC	[-0.0089 , -0.0009]	0.95094
SVR	[-0.0465 , 0.0032]	0.95094
SVRRC	[-0.0504 , -0.0033]	0.95094

Table 15: Confidence intervals for algorithm MTSC ( $\alpha=0.95$ )

## 6 Detailed results for RC

### 6.1 Results

VS	$R^+$	$R^-$	Exact P-value	Asymptotic P-value
SVRCC	50.0	250.0	$\geq 0.2$	1
MORF	110.0	190.0	$\geq 0.2$	1
ST	76.0	224.0	$\geq 0.2$	1
MTS	112.0	188.0	$\geq 0.2$	1
MTSC	126.0	174.0	$\geq 0.2$	1
ERC	58.5	217.5	$\geq 0.2$	1
ERCC	88.0	212.0	$\geq 0.2$	1
SVR	72.0	228.0	$\geq 0.2$	1
SVRRC	60.0	240.0	$\geq 0.2$	1

Table 16: Results obtained by the Wilcoxon test for algorithm RC

### 6.2 Confidence intervals for Median of differences

$\alpha=0.90$	Confidence interval	Exact confidence
SVRCC	[-0.0553 , -0.01315]	0.9049
MORF	[-0.0211 , 0.0037]	0.9049
ST	[-0.00885 , -0.00065]	0.9049
MTS	[-0.00815 , 0.0032]	0.9049
MTSC	[-0.0054 , 0.0045]	0.9049
ERC	[-0.0047 , -0.0006]	0.9049
ERCC	[-0.00875 , -0.00035]	0.9049
SVR	[-0.0454 , -0.00525]	0.9049
SVRRC	[-0.05145 , -0.0094]	0.9049

Table 17: Confidence intervals for algorithm RC ( $\alpha=0.90$ )

$\alpha=0.95$	Confidence interval	Exact confidence
SVRCC	[-0.0582 , -0.0114]	0.95094
MORF	[-0.0263 , 0.0055]	0.95094
ST	[-0.0102 , -0.0003]	0.95094
MTS	[-0.0104 , 0.0059]	0.95094
MTSC	[-0.0065 , 0.0066]	0.95094
ERC	[-0.0051 , -0.0005]	0.95094
ERCC	[-0.01005 , 0.00025]	0.95094
SVR	[-0.04845 , -0.0033]	0.95094
SVRRC	[-0.0545 , -0.0079]	0.95094

Table 18: Confidence intervals for algorithm RC ( $\alpha=0.95$ )

## 7 Detailed results for ERC

### 7.1 Results

VS	$R^+$	$R^-$	Exact P-value	Asymptotic P-value
SVRCC	71.0	229.0	$\geq 0.2$	1
MORF	149.0	151.0	$\geq 0.2$	1
ST	156.5	143.5	$\geq 0.2$	0.84092
MTS	168.5	107.5	$\geq 0.2$	0.343913
MTSC	192.5	83.5	0.10125999999999999	0.093112
RC	217.5	58.5	0.014197000000000001	0.014213
ERCC	118.0	182.0	$\geq 0.2$	1
SVR	96.0	204.0	$\geq 0.2$	1
SVRRC	81.0	219.0	$\geq 0.2$	1

Table 19: Results obtained by the Wilcoxon test for algorithm ERC

### 7.2 Confidence intervals for Median of differences

$\alpha=0.90$	Confidence interval	Exact confidence
SVRCC	[-0.04605 , -0.0074]	0.9049
MORF	[-0.00995 , 0.00865]	0.9049
ST	[-0.0016 , 0.0053]	0.9049
MTS	[-0.0015 , 0.0104]	0.9049
MTSC	[0 , 0.0108]	0.9049
RC	[0.0006 , 0.0047]	0.9049
ERCC	[-0.004 , 0.001]	0.9049
SVR	[-0.0308 , 0.00135]	0.9049
SVRRC	[-0.04 , -0.00525]	0.9049

Table 20: Confidence intervals for algorithm ERC ( $\alpha=0.90$ )

$\alpha=0.95$	Confidence interval	Exact confidence
SVRCC	[-0.0515 , -0.0042]	0.95094
MORF	[-0.0121 , 0.00965]	0.95094
ST	[-0.00235 , 0.00595]	0.95094
MTS	[-0.00205 , 0.01205]	0.95094
MTSC	[-0.0002 , 0.01165]	0.95094
RC	[0.0005 , 0.0051]	0.95094
ERCC	[-0.0046 , 0.00175]	0.95094
SVR	[-0.03655 , 0.00705]	0.95094
SVRRC	[-0.04665 , -0.0037]	0.95094

Table 21: Confidence intervals for algorithm ERC ( $\alpha=0.95$ )



## 8 Detailed results for ERCC

### 8.1 Results

VS	$R^+$	$R^-$	Exact P-value	Asymptotic P-value
SVRCC	79.0	221.0	$\geq 0.2$	1
MORF	170.0	130.0	$\geq 0.2$	0.558068
ST	203.0	97.0	0.13552	0.122316
MTS	193.0	107.0	$\geq 0.2$	0.212283
MTSC	245.0	31.0	5.518E-4	0.000985
RC	212.0	88.0	0.07872	0.074146
ERC	182.0	118.0	$\geq 0.2$	0.353111
SVR	110.0	190.0	$\geq 0.2$	1
SVRRC	91.0	209.0	$\geq 0.2$	1

Table 22: Results obtained by the Wilcoxon test for algorithm ERCC

### 8.2 Confidence intervals for Median of differences

$\alpha=0.90$	Confidence interval	Exact confidence
SVRCC	[-0.0431 , -0.004]	0.9049
MORF	[-0.00825 , 0.0114]	0.9049
ST	[-0.00025 , 0.00455]	0.9049
MTS	[-0.00225 , 0.00915]	0.9049
MTSC	[0.0014 , 0.00725]	0.9049
RC	[0.00035 , 0.00875]	0.9049
ERC	[-0.001 , 0.004]	0.9049
SVR	[-0.0317 , 0.0058]	0.9049
SVRRC	[-0.0375 , -0]	0.9049

Table 23: Confidence intervals for algorithm ERCC ( $\alpha=0.90$ )

$\alpha=0.95$	Confidence interval	Exact confidence
SVRCC	[-0.04755 , -0.0011]	0.95094
MORF	[-0.01105 , 0.0124]	0.95094
ST	[-0.00115 , 0.0069]	0.95094
MTS	[-0.0027 , 0.0108]	0.95094
MTSC	[0.0009 , 0.0089]	0.95094
RC	[-0.00025 , 0.01005]	0.95094
ERC	[-0.00175 , 0.0046]	0.95094
SVR	[-0.0372 , 0.00905]	0.95094
SVRRC	[-0.0426 , 0.0043]	0.95094

Table 24: Confidence intervals for algorithm ERCC ( $\alpha=0.95$ )

## 9 Detailed results for SVR

### 9.1 Results

VS	$R^+$	$R^-$	Exact P-value	Asymptotic P-value
SVRCC	3.0	297.0	$\geq 0.2$	1
MORF	195.0	105.0	$\geq 0.2$	0.193601
ST	205.5	94.5	0.1174	0.107068
MTS	212.0	88.0	0.07872	0.074146
MTSC	208.0	92.0	0.1011	0.094637
RC	228.0	72.0	0.02486	0.024906
ERC	204.0	96.0	0.12802	0.119437
ERCC	190.0	110.0	$\geq 0.2$	0.245524
SVRRC	51.0	249.0	$\geq 0.2$	1

Table 25: Results obtained by the Wilcoxon test for algorithm SVR

### 9.2 Confidence intervals for Median of differences

$\alpha=0.90$	Confidence interval	Exact confidence
SVRCC	[-0.0134 , -0.00625]	0.9049
MORF	[-0.00555 , 0.0245]	0.9049
ST	[-0.00075 , 0.03035]	0.9049
MTS	[0.00175 , 0.0384]	0.9049
MTSC	[-0.00025 , 0.041]	0.9049
RC	[0.00525 , 0.0454]	0.9049
ERC	[-0.00135 , 0.0308]	0.9049
ERCC	[-0.0058 , 0.0317]	0.9049
SVRRC	[-0.0079 , -0.0021]	0.9049

Table 26: Confidence intervals for algorithm SVR ( $\alpha=0.90$ )

$\alpha=0.95$	Confidence interval	Exact confidence
SVRCC	[-0.01395 , -0.00535]	0.95094
MORF	[-0.0096 , 0.02835]	0.95094
ST	[-0.00385 , 0.0362]	0.95094
MTS	[-0.0015 , 0.0426]	0.95094
MTSC	[-0.0032 , 0.0465]	0.95094
RC	[0.0033 , 0.04845]	0.95094
ERC	[-0.00705 , 0.03655]	0.95094
ERCC	[-0.00905 , 0.0372]	0.95094
SVRRC	[-0.0087 , -0.00155]	0.95094

Table 27: Confidence intervals for algorithm SVR ( $\alpha=0.95$ )

## 10 Detailed results for SVRRC

### 10.1 Results

VS	$R^+$	$R^-$	Exact P-value	Asymptotic P-value
SVRCC	33.5	266.5	$\geq 0.2$	1
MORF	203.0	97.0	0.13552	0.126371
ST	224.0	76.0	0.03398	0.032663
MTS	225.0	75.0	0.03148	0.030995
MTSC	224.0	76.0	0.03398	0.032663
RC	240.0	60.0	0.008714	0.009718
ERC	219.0	81.0	0.04906	0.047065
ERCC	209.0	91.0	0.0951	0.089131
SVR	249.0	51.0	0.003504	0.004471

Table 28: Results obtained by the Wilcoxon test for algorithm SVRRC

### 10.2 Confidence intervals for Median of differences

$\alpha=0.90$	Confidence interval	Exact confidence
SVRCC	[-0.0063 , -0.0017]	0.9049
MORF	[-0.0012 , 0.0305]	0.9049
ST	[0.0048 , 0.03635]	0.9049
MTS	[0.006 , 0.04595]	0.9049
MTSC	[0.0059 , 0.04825]	0.9049
RC	[0.0094 , 0.05145]	0.9049
ERC	[0.00525 , 0.04]	0.9049
ERCC	[0 , 0.0375]	0.9049
SVR	[0.0021 , 0.0079]	0.9049

Table 29: Confidence intervals for algorithm SVRRC ( $\alpha=0.90$ )

$\alpha=0.95$	Confidence interval	Exact confidence
SVRCC	[-0.00735 , -0.0016]	0.95094
MORF	[-0.00575 , 0.035]	0.95094
ST	[0.0019 , 0.0417]	0.95094
MTS	[0.0021 , 0.0488]	0.95094
MTSC	[0.0033 , 0.0504]	0.95094
RC	[0.0079 , 0.0545]	0.95094
ERC	[0.0037 , 0.04665]	0.95094
ERCC	[-0.0043 , 0.0426]	0.95094
SVR	[0.00155 , 0.0087]	0.95094

Table 30: Confidence intervals for algorithm SVRRC ( $\alpha=0.95$ )