

# **NOTE AF: THE WILKINSON-SAWITSKI SERIES OF TESTS ON EXCEL 2007<sup>1</sup>**

## **THE BASIC DATA SET<sup>2</sup>**

| Labels | X | ZERO | MISS | BIG      | LITTLE     | HUGE  | TINY  | ROUND |
|--------|---|------|------|----------|------------|-------|-------|-------|
| ONE    | 1 | 0    |      | 99999991 | 0.99999991 | 1E+12 | 1E-12 | 0.5   |
| TWO    | 2 | 0    |      | 99999992 | 0.99999992 | 2E+12 | 2E-12 | 1.5   |
| THREE  | 3 | 0    |      | 99999993 | 0.99999993 | 3E+12 | 3E-12 | 2.5   |
| FOUR   | 4 | 0    |      | 99999994 | 0.99999994 | 4E+12 | 4E-12 | 3.5   |
| FIVE   | 5 | 0    |      | 99999995 | 0.99999995 | 5E+12 | 5E-12 | 4.5   |
| SIX    | 6 | 0    |      | 99999996 | 0.99999996 | 6E+12 | 6E-12 | 5.5   |
| SEVEN  | 7 | 0    |      | 99999997 | 0.99999997 | 7E+12 | 7E-12 | 6.5   |
| EIGHT  | 8 | 0    |      | 99999998 | 0.99999998 | 8E+12 | 8E-12 | 7.5   |
| NINE   | 9 | 0    |      | 99999999 | 0.99999999 | 9E+12 | 9E-12 | 8.5   |

MISS represents blank cells (no data)

## **THE TEST EXERCISES**

### **II.A PRINT ROUND WITH ONLY ONE DIGIT**

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

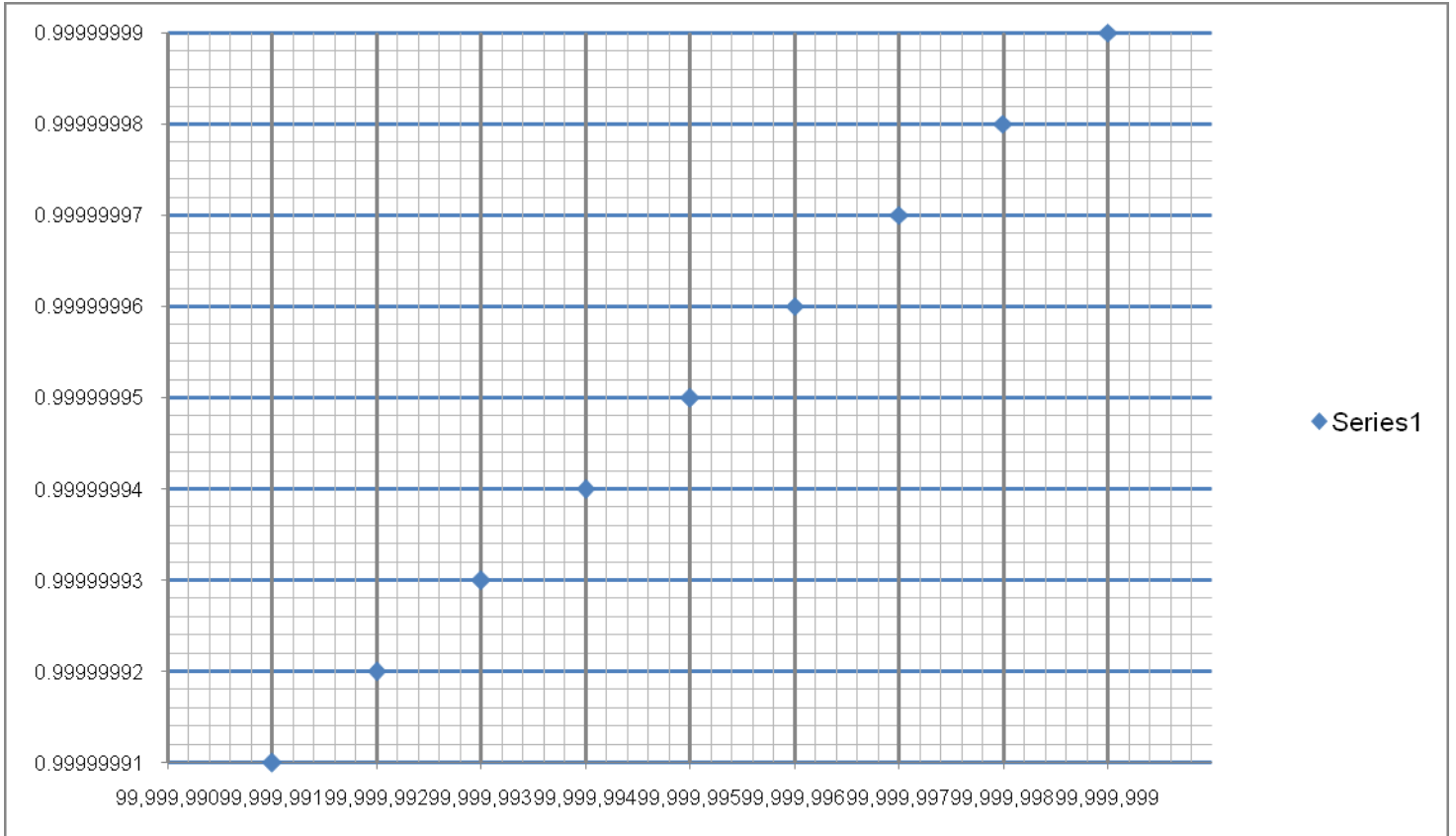
**PASS**

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<sup>1</sup> Described in Sawitzki 1994. He combined the Wilkinson 1985 series of tests with some additional tests to form a suite of four problems.

<sup>2</sup> This is Wilkinson'd (1985) basic test data set.

**II.B PLOT HUGE AGAINST TINY IN A SCATTER PLOT**



**PASS**

**II.C COMPUTE BASIC STATISTICS ON ALL VARIABLES**

LRE Values

|                    | X     | ZERO | BIG   | LITTLE | HUGE  | TINY | ROUND |
|--------------------|-------|------|-------|--------|-------|------|-------|
| Means              | 16    | 16   | 16    | 16     | 16    | 16   | 16    |
| Standard Deviation | 15.79 | 16   | 15.79 | 9.28   | 15.75 | 16   | 15.79 |

**PASS**

**II.D COMPUTE THE CORRELATION MATRIX ON ALL VARIABLES**

Excel cells too big to show. All cells were 1.000000000000000E+00

**PASS**

**II.E TABULATE X AGAINST X, USING BIG AS A CASE WEIGHT.**

No corresponding Excel function. Nothing to test.

## II.F REGRESS BIG ON X

LINEST

1.000000000000000E+00 9.999999000000000E+07  
3.846881557085040E-17 2.164761174550900E-16  
1.000000000000000E+00 2.979781641084560E-16  
6.757442676344590E+32 7.000000000000000E+00  
6.000000000000000E+01 6.215369039981220E-31

BIG = 9.999999000000 + 1.000000000000000 \* X

PASS

## III THE MISS TESTS.

Blank cells in Excel result in error outputs. Can't test.

## IV.A REGRESS X ON X<sup>2</sup>, X<sup>3</sup> ..... X<sup>9</sup>

Regression coefficients

| SAWITZKI      | EXCEL 2007 LINEST      |
|---------------|------------------------|
| 3.534860E-01  | 3.534857623781990E-01  |
| 1.142340E+00  | 1.142341141812520E+00  |
| -7.049450E-01 | -7.049453717944300E-01 |
| 2.623530E-01  | 2.623527142625080E-01  |
| -6.163500E-02 | -6.163498854332120E-02 |
| 9.205360E-03  | 9.205358395061110E-03  |
| -8.474770E-04 | -8.474774395400420E-04 |
| 4.383500E-05  | 4.383503997595070E-05  |
| -9.741120E-07 | -9.741119994602610E-07 |

No essential differences

PASS

## IV.B REGRESS X ON X.

LINEST Output

1.000000000000000E+00 8.881784197001250E-16  
3.846881557085040E-17 2.164761174550900E-16  
1.000000000000000E+00 2.979781641084560E-16  
6.757442676344590E+32 7.000000000000000E+00  
6.000000000000000E+01 6.215369039981220E-31

$$X = 2.16476E-16 + 1.000000000000 * X$$

**PASS**

**IV.C REGRESS X ON (BIG, LITTLE)**

LINEST Output

|                       |                       |                        |
|-----------------------|-----------------------|------------------------|
| 0.000000000000000E+00 | 1.000000000000000E+00 | -9.999990000000000E+07 |
| 0.000000000000000E+00 | 3.846881557085040E-17 | 3.846881364740960E-09  |
| 1.000000000000000E+00 | 2.979781641084560E-16 | #N/A                   |
| 6.757442676344590E+32 | 7.000000000000000E+00 | #N/A                   |
| 6.000000000000000E+01 | 6.215369039981220E-31 | #N/A                   |

The data set has a singularity because BIG and LITTLE are linearly dependent. The Excel LINEST function recognizes this singularity and sets the coefficient of one of them to zero. In this case it regressed on LITTLE

**PASS**

**IV.D REGRESS ZERO ON X.**

LINEST Output

|                       |                       |
|-----------------------|-----------------------|
| 0.000000000000000E+00 | 0.000000000000000E+00 |
| 0.000000000000000E+00 | 0.000000000000000E+00 |
| 1.000000000000000E+00 | 0.000000000000000E+00 |
| #NUM!                 | 7.000000000000000E+00 |
| 0.000000000000000E+00 | 0.000000000000000E+00 |

Both coefficients are zero

**PASS**

**IV.E REGRESS X ON X2 TO X9 BUT USING THE REGRESSORS IN A PERMUTED ORDER.**

| Order | Variable | Permuted Value         | Original value         | LRE   |
|-------|----------|------------------------|------------------------|-------|
|       | cons     | 3.534857623782270E-01  | 3.534857623781990E-01  | 13.09 |
| 1     | X^8      | 4.383503997595070E-05  | 4.383503997595070E-05  | 16.00 |
| 2     | X^9      | -9.741119994602610E-07 | -9.741119994602610E-07 | 16.00 |
| 3     | X^4      | 2.623527142625080E-01  | 2.623527142625080E-01  | 16.00 |
| 4     | X^5      | -6.163498854332120E-02 | -6.163498854332120E-02 | 16.00 |
| 5     | X^2      | 1.142341141812520E+00  | 1.142341141812520E+00  | 16.00 |
| 6     | V^3      | -7.049453717944300E-01 | -7.049453717944300E-01 | 16.00 |
| 7     | X^6      | 9.205358395061110E-03  | 9.205358395061110E-03  | 16.00 |
| 8     | X^7      | -8.474774395400420E-04 | -8.474774395400420E-04 | 16.00 |

No essential difference

PASS

## CONCLUSIONS

Excel 2007 passed all tests.

