Amanda Folsom and Ken Ono's Error Could Have (and Should Have!) been Discovered by Their Computers (in Less than Three Seconds!)

Shalosh B. EKHAD [1]

Experimental Mathematics giants, David Bailey and Jonathan Borwein, describe ([BB]) how the use of computers is revolutionizing doing mathematics. The most *obvious* and *trivial* use, that *even* "pure" mathematicians (like Amanda Folsom and Ken Ono) should be able to do, is the *empirical* checking of formulas and statements. Unfortunately, they don't. Frank Garvan (see [AGL]) discovered that the statement of Theorem 1.2 in [FO] is false as stated. You can't trust humans, they are such screw-ups! This prompted me to find out for myself.

Once the short Maple code (written in a few minutes by D. Zeilberger):

`http://www.math.rutgers.edu/~zeilberg/tokhniot/KenAmandaError` ,

is downloaded and read (or copied-and-pasted) into a Maple session, typing:

`CheckKenAmanda(507);` ,

returns (in less than three seconds!):

`false` .

(Note that $24 \cdot 507 - 1 = 23 \cdot (23)^2$, but $spt(507)$ is even).

The fascinating paper [AGL] contains a corrected statement of this theorm, and *much nicer* proofs (**not** using Maass forms, but rather elegant combinatorial arguments). It also describes how to fix the original proof of [F0].

References

[AGL] G.E. Andrews, F. G. Garvan, and J. Liang, *Self-conjugate vector partitions and the parity of the spt-function*, `http://www.math.ufl.edu/~fgarvan/papers/spt-parity.pdf` .

[BB] David H. Bailey and Jonathan M. Borwein, *Exploratory Experimentation and Computation*, Notices of the Amer. Math. Soc. **58** (2011), 1410-1419.

[FO] A. Folsom and K. Ono, *The spt-function of Andrews*, Proc. Natl. Acad. Sci. USA **105** (2008), 20152-20156.

[1] c/o `zeilberg at math dot rutgers dot edu`.

Exclusively published in: `http://www.math.rutgers.edu/~zeilberg/pj.html` . Nov. 22, 2011.