European Society for Mathematics and the Arts

Newsletter

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Dear Reader,

1) In February, I was in Uganda without my phone, left in France. I did, however, record a call from the person in charge of cultural activities at Dassault Aviation (the Falcon and the Rafale). ESMA was invited to have a math-art exhibition for the employees of the two companies, Dassault Aviation and Dassault Systems involved in computer science and simulation.

This exhibition will take place in Suresnes, a city along the Seine, on the opposite side of the Bois de Boulogne, during the French week for Mathematics, 13-17 March 2017.

The general public will not be allowed to visit, except for ESMA members and invited people. A conference will be given on Thursday 16, at 12.30.

The themes of the conference will be slightly different from those of Florence and Lausanne. The first part of a synthetic text lying on these two last conferences recently appeared in a new journal Scripta Philosophiae Naturalis (http://www.math-art.eu/Documents/pdfs/claude-p-bruter-mathc3a9matiques-et-arts-deux-confc3a9rences1.pdf).

2) The content of the exhibition will be similar as those of Florence and Lausanne. The two boxes coming from Lausanne reached their destination at 1.30 p.m. only on February First! One can imagine my anxiety during the three month wait necessary to get the boxes. We are greatly indebted to Anne Wagner from transport@shipea.com who fought with the custom to get our boxes home. Besides the transportation was not costly. We shall keep on working with this company. We would also like to thank Maroussia Schaffner Portillo, the secretary of the math department of EPFL, who greatly helped us.

3) The universe of standard numbers remains full of mysteries, looking sometimes very easy to formulate as for instance the old Goldbach conjecture (any even number is sum of

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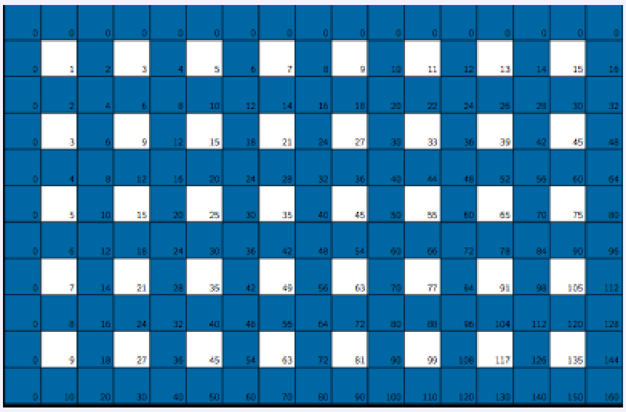
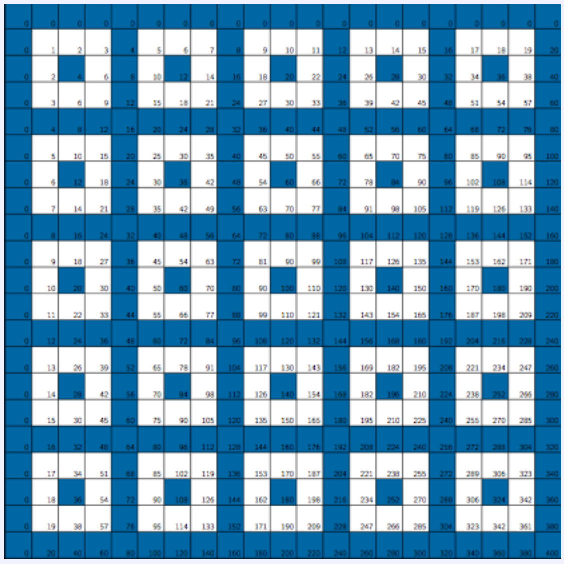
two primes). In his famous book, Gauss introduced the study of quadratic numbers, mainly the resolution of the representation of a number by quadratic forms, the simplest being the integers n^2 *(cf his article 319) - I suppose that he was inspired by Fermat-Lagrange theorems. In a recent paper (*http://scholarship.claremont.edu/cgi/viewcontent.cgi?article=1352&context=jhm*), Zoheir Barka from Lagouhat University (Algeria) began to look at the properties of the series* $(a.b)$*(modulo* k*) when* a *and* b *runs along the set of positive integers. One may first consider the case where* a *and* b *are respectively less than* n *and* m*.*

Z.B.'s originality was to visualize the behavior of the elements of these series through a colored square $n \times m$ *matrix whose generic colored element is a small square representing* $(a.b)$*(mod* k*). In the three first easiest examples where* k *is respectively* 2, 4 *and* 6*, a small square is blue when* $(a.b)$*(mod* k*)* $= 0$*, white when* $(a.b)$*(mod* k*) is not null:*



mod 2



mod 4

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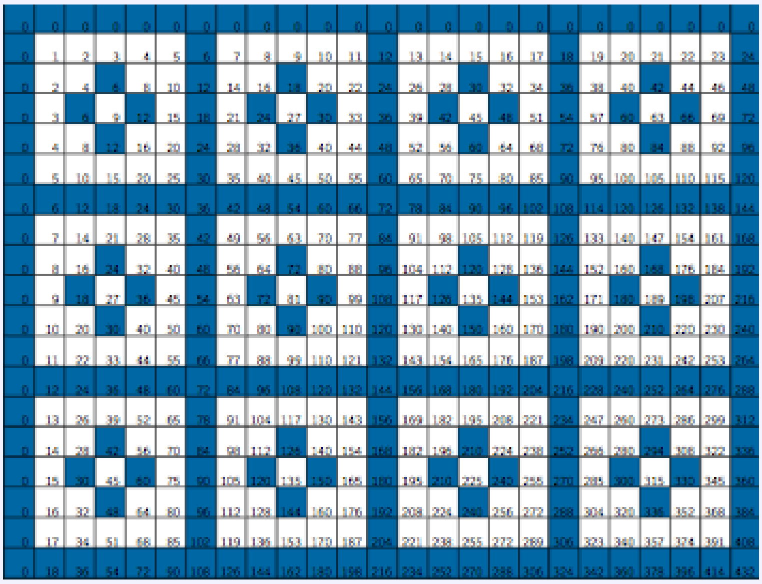
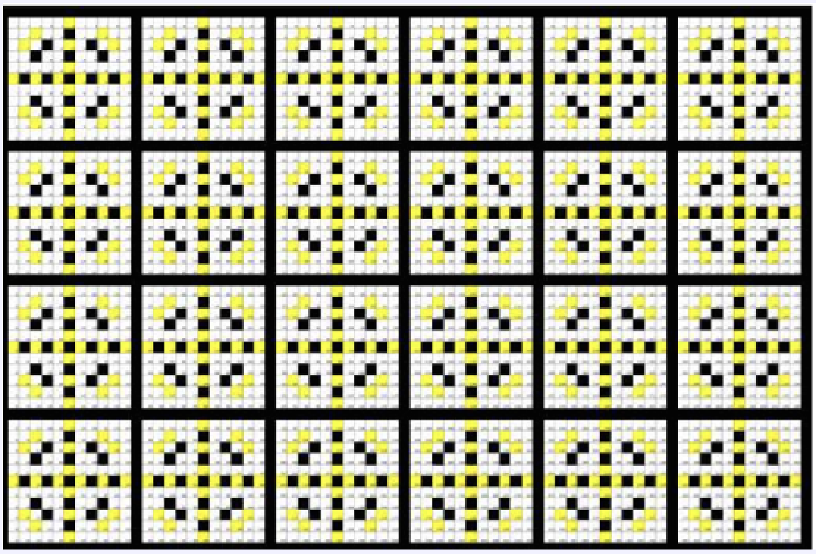


mod 6

Then Z.B. keeps on using various lists of simultaneous moduli : $(a.b)(mod\ k_1, mod\ k_2, ...)$.



yellow for numbers that equal 0 mod 6, black for those that equal 0 mod 12

He also fixes « one modulus k and assigns colors to cells depending on their remainder with respect to k, then all the squares can be filled in. For example, let 0 mod 5 be black, 1 mod 5 be green, 2 mod 5 be red, 3 mod 5 be purple, and 4 mod 5 be red; the following figure is obtained »:

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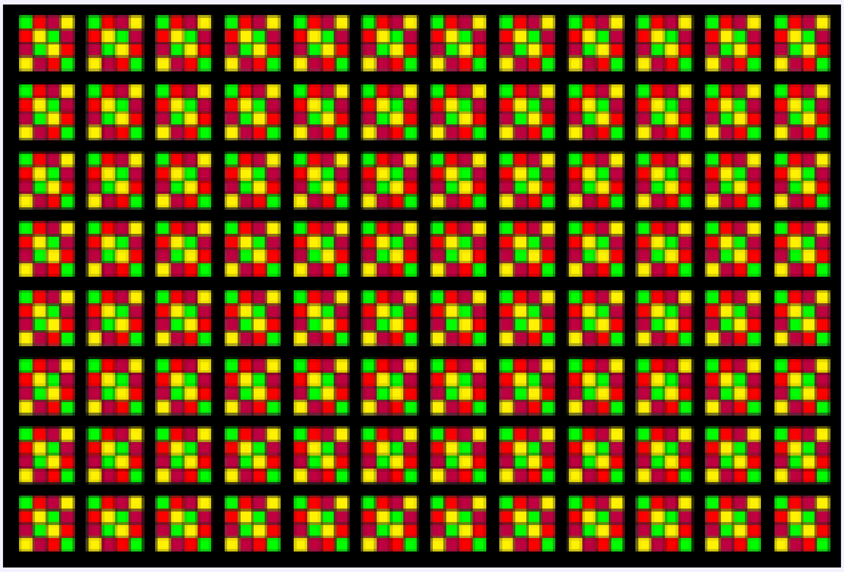

The reader might generalize this construction by considering larger series $(a_1.a_2. \ldots .a_r)(\bmod\ k_1, \bmod\ k_2, \ldots, \bmod\ k_s)$ in order to get maybe more fascinating views in r-dimensional spaces. Indeed, for reasons of stability linked with transversality, it would be better to consider $(a.b)$ with $a = a_1.a_2. \ldots .a_p$ and $b = b_1.b_2. \ldots .b_{r-p}$.

Best wishes,
Claude

P.S. 2017 Gifts and dues will be very useful to prepare our next activities. Please look at : http://www.math-art.eu/adhesion.php and use Western Union.

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