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aan abstract

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Preliminary title :
The passage from E. von Koch and E. Cesàro curves to G. De Rham fractals.
Abstract :
The most important contribute for the development of fractal geometry goes to Benoît Mandelbrot, but many other mathematicians in the century preceding him had laid the foundations for his work. Moreover, Mandelbrot owes a great deal of his advancements to his ability to use computer technology, an advantage that his predecessors distinctly lacked; however, this in no way detracts from his visionary achievements. Nevertheless, while acknowledging and understanding the accomplishments of Mandelbrot, it undoubtedly helps to have some familiarity with the relevant works of Karl Weierstrass, Georg Cantor, Felix Hausdorff, Gaston Julia, Pierre Fatou and Paul Lévy and many others mathematicians. Elge von Koch, Swedish mathematician, is famous for his Koch snowflake (also known as the Koch curve, Koch star, or Koch island) a mathematical curve and one of the earliest fractal curves to have been described. It is based on the Koch curve, which appeared in a 1904 paper titled "On a continuous curve without tangents, constructible from elementary geometry" (original French title: Sur une courbe continue sans tangente, obtenue par une construction géométrique élémentaire). The Koch snowflake can be constructed by starting with an equilateral triangle, then recursively altering each line segment as follows: 1. divide the line segment into three segments of equal length. 2. draw an equilateral triangle that has the middle segment from step 1 as its base and points outward. 3. remove the line segment that is the base of the triangle from step 2. After one iteration of this process, the resulting shape is the outline of a hexagram. The Koch snowflake is the limit approached as the above steps are followed over and over again. The Koch curve originally described by Helge von Koch is constructed with only one of the three sides of the original triangle. In 1984, Ernesto Cesàro (March 12, 1859 – September 12, 1906) an Italian mathematician, who worked in the field of differential geometry, in his book Lessons of intrinsic geometry, explains in particular the construction of a fractal curve, in 1905 Cesàro also studied the "snowflake curve" of Koch, continuous but not differentiable in all its points. The curves of Cesàro (or Cesàro Faber-curves) are special cases of fractal curves of De Rham generated by affine transformations which retain the orientation, with the following fixed points P0=0 P1=1. In the paper the study of connections among von Koch, Cesàro and De Rham, from an historical point of view. Alfieri A. “ L-system fractal as geometric patterns: a case study.” Springer Book 336890 Aldon Mathematics and Technology (in stampa) Alfieri A.“ L-system fractal: an educational approach by new technologies.” 2015 International Commission for the study and improvement of mathematics education. International conference. Proceedings CIEAEM

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