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Numerical study of the butterfly effect on the solutions of the logistic difference equation using arbitrary significant digits JESUS RODRIGUEZ-NUNEZ, JESUS CASTILLO, Departamento de Investigacion en Fisica, Universidad de Sonora, MARTIN MOLINAR-TABARES, Organismo de Cuenca Noroeste, Comision Nacional del Agua — The solutions of the logistic difference equation when they are under the influence of the chaotic regime are very sensitive to initial conditions due to the butterfly effect. In this study we used arbitrary significant digits to generate solutions of the logistic difference equation under the influence of chaos, and a follow of its effects along each digit of the solutions was made. A large amount of significant digits to generate the solutions is necessary since it is the only way of naturally appreciating the implications of chaos on these solutions. We compared digit by digit the numerical solutions that were generated by several different initial conditions that contain modifications in a very far significant digit, with respect to the solution of another initial condition that was selected for a control solution. The results shown that it is possible to track the butterfly effect and easily predict the moment on which its effects will be noticeable.

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