

KEY TO DIGITAL COMPUTER PHOTOGRAPHS

The differential equations which are being solved are:

$$\begin{aligned} x'' &= nx - \frac{e}{3} x^3 + e x y^2 \\ y'' &= -ny - \frac{e}{3} y^3 + e y x^2 \end{aligned}$$

See Powell MAC-JLP-1

There are 20 Runge-Kutta steps per sector (one focussing and one defocussing lens) and the computer can print a point at each step or at specified intervals from the beginning.

The x motion starts at the entrance to a defocussing lens and the y motion always starts at the entrance of a focussing lens therefore,

$$20 h = \frac{2\pi}{N} \quad \text{where } N \text{ is the number of sectors in the machine.}$$

Thus h is the number of radians between printed points.

The code stops if $x > .5$ or $y > .5$

The code can take $0 < n < 2000$

The code can take $0 < e < 2000$

The code can take $0 < h < .03$

The axes have extent $\pm .5$ and 256 R-K steps on the horizontal axis.