Extract from the user's guide `PBSddesolve-UG.pdf` *found in the directory* `.../library/PBSddesolve/doc`. *For further information, please see the complete guide.*

4.3 Lorenz – (ODE Example)

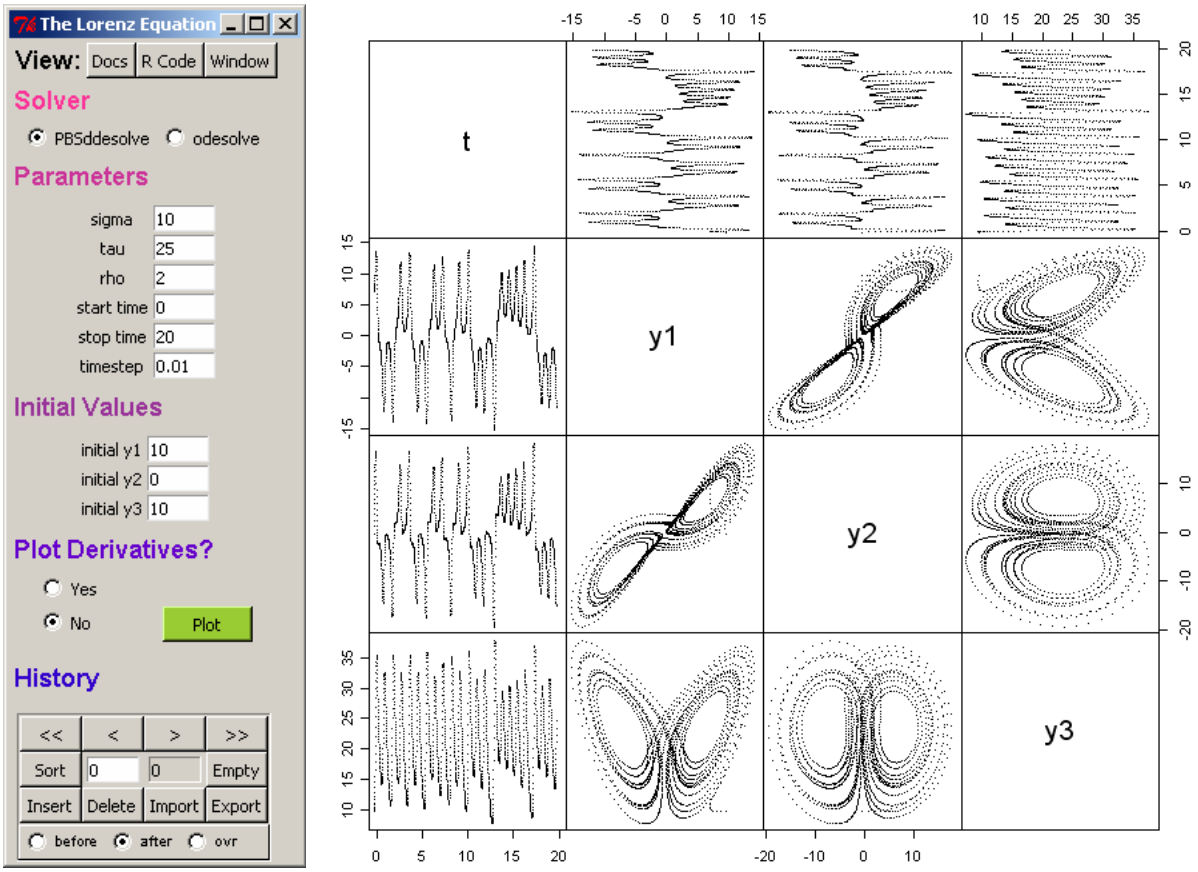

Figure 3. The Lorenz model demonstrates chaotic behaviour in the solution of thee linked differential equations.

The Lorenz model (http://planetmath.org/encyclopedia/LorenzEquation.html) consists of three ordinary differential equations for a three-dimensional state vector *y*:

$$\frac{dy_1}{dt} = \sigma(y_2 - y_1),$$

$$\frac{dy_2}{dt} = y_1(\tau - y_3) - y_2,$$

$$\frac{dy_3}{dt} = y_1 y_2 - \rho y_3,$$

with three parameters (σ, τ, ρ). This demonstration includes a GUI for adjusting the parameters and initial conditions to see results from integrating the Lorentz model. It also allows the solution to be obtained with either **PBSddesolve** or **odesolve**. The choice of numerical solver should not affect the results of the plot, even though these two packages use different underlying algorithms for estimating the solution. Tests indicate that both solvers return comparable results, a result that gives us some confidence that **PBSddesolve** performs correctly.