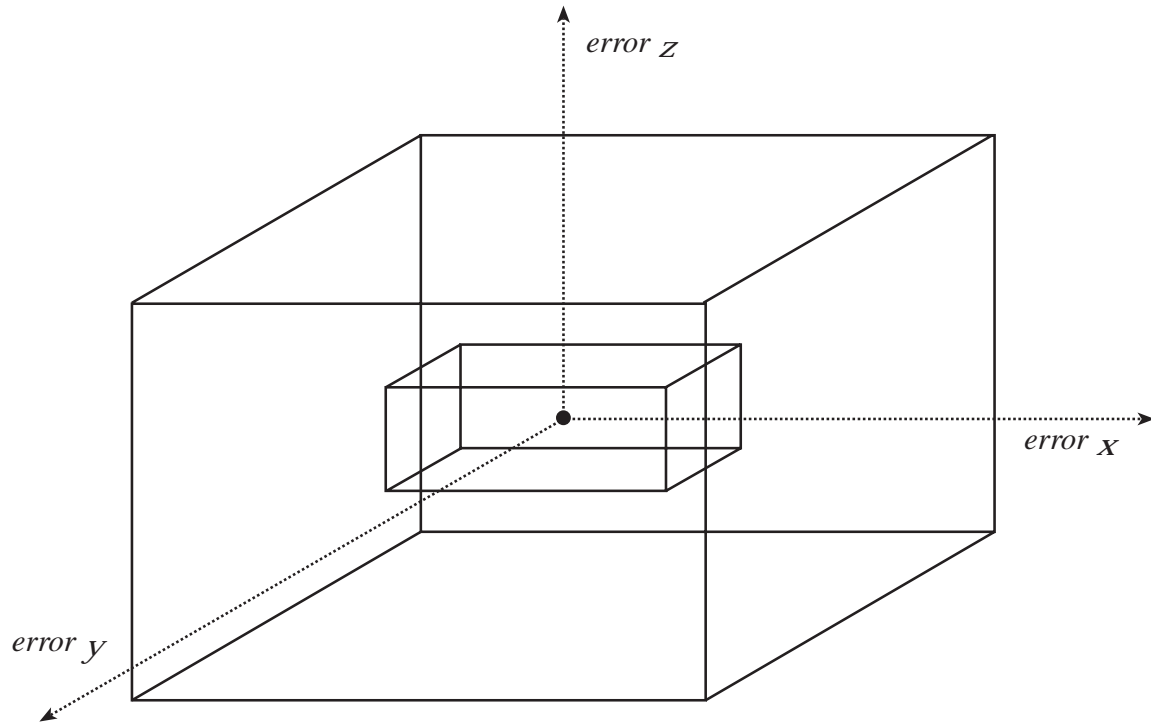


## IMPLEMENTATION OF THE AMIGA SYSTEM

AMIGA is a dynamic simulation system with a one year time step. The AMIGA system uses a modified Gauss-Seidel convergence method. In each period the model converges to an equilibrium solution, given the exogenous inputs for the current period and the state variables calculated from the previous period. During convergence, the AMIGA operating shell calls the final demand and production modules, including both price and quantity equations.

The AMIGA system uses a strategy of multi-level neighborhoods of convergence to find a period's general equilibrium solution. The system tightens the convergence criteria as the system converges. That is, it first solves the model using loose criteria, bringing all the model variables within a neighborhood of convergence. Then it makes the convergence criteria successively tighter until it achieves the desired level of accuracy. Figure 1 uses a simple three-dimensional example to illustrate a smaller neighborhood of convergence embedded within a larger one.



**FIGURE 1 Illustration of Multi-level Neighborhoods of Convergence**

The method of multi-level neighborhoods of convergence is an efficient numerical approach. It avoids the extra computation of attempting to accurately solve a subproblem, only to find that its solution is invalid because other model variables, which are passed externally to it, have not yet converged.

Using the Gauss-Seidel method, individual equations in the system are solved sequentially. Variables on the right-hand-side of an equation are replaced by their most recently computed values. This process repeats until all errors are arbitrarily close to zero. The rate of convergence depends on the eigenvalues of the system.

The AMIGA system is programmed in C, which is a high-level, logical, transparent, efficient, and flexible language for model development. Traditionally, it has been used both for operating systems software and applications programming. It is well suited for organizing a complex system into a hierarchy of straightforward steps, and hence for integrating modules within a general equilibrium system. Numerical computations are

fast and use double precision, allowing for rapid and accurate convergence to a general equilibrium solution.