# Robot Kinematic Chain

The robot path is specified I terms of a "position equation" made up of a series of homogeneous matrix transforms relation the manipulator to the task.



Figure 1 Position Equation

This position equation is evaluated many times a second, each time providing a new set of joint angles positions for the manipulator to follow. This type of transform will execute a function each sample period containing an equation to define its values. The Trajectory Generator will use the new values in the position equation. Sensor integration is accomplished in the same manner; new transforms are determined by sensor input instead of by equations.

Sample program:

#include typedef.h"

void cybotask()

{

DevicePtr robot;

TransformPtr base, tool, table, place\_a, place\_b;

bobot = get\_device("FanucLRMate200iD");

base = make\_transform("BASE", constant, p\_vector,

inches, 0.0, 64.75, -0.5, nostore);

tool = make\_transform("TOOL", constant, p\_vector,

millimeters, 0.0, 0.0, 117.4, nostore);

table = make\_transform("TABLE", constant, p\_vector,

millimeters, 1000.0, 1000.0, 700.0,

rpy\_angles, degrees, 0.0, 0.0, 90.0, nostore);

place\_a = make\_transform("PLACE\_A", constant, p\_vector,

millimeters, 150.0, 100.0, 0.0, nostore);

place \_b= make\_transform("PLACE\_B", constant, p\_vector,

millimeters, 150.0, 250.0, 0.0, nostore);

position\_a = make\_position("POSITION A",

base,robot, tool, EQUALS, table, place-a,

TOO, tool);

position\_b = make\_position("POSITION A",

base,robot, tool, EQUALS, table, place-a,

TOO, tool);

set\_segment\_tim(robot, .l5);

set\_translational\_velocity(robot, 100.0);

set rotoational\_velocity(robot, 10.0);

set\_cartesian\_mode(robot);

move(position\_a)

move(position\_b);

}