**Adept V+ Kinematics Commands**

**SET *loc\_var* = loc\_exp**

assigns a location expression to a location variable (PI).

**TRANS(x, y, z, n, p, r)**

returns a transformation defined by six Cartesian components (F).

**RX(ang), RY(ang), RZ(ang)**

returns single axis rotation transformations (F).

**SHIFT(trans BY x, y, z)**

returns a translation-shifted transformation (F).

**DECOMPOSE array[index] = loc**

stores the location components of a location variable (precision point or transformation) in an array starting at a given index (PI).

**DX(loc), DY(loc), DZ(loc)**

returns the displacement components of a transformation (F).

**SOLVE.TRANS loc\_var, ERROR=array[index]**

calculates location transformation given an indexed array of joint values. ERROR = return status.  (PI)

**SOLVE.ANGLES joints[index], joints\_flag1, ERROR=trans, start[index], start\_flag**

computes joint positions from a location transformation. ERROR = return status, flag = 0:LEFTY, 1:RIGHTY. (PI)

**INRANGE(loc)**

determines whether or not a location is reachable (i.e., is in the workspace) (F).

**FRAME(loc1, loc2, loc3, loc4)**

returns transformation defining a frame with origin at loc4, x-axis from loc1 to loc2, and y-axis from x-axis to loc3.

**TOOL [trans]**

defines tool transformation between the tool mounting flange to the tool tip (MC, PI, F).

**Note**:   
for the jaw gripper, use **TOOL = TRANS(0,0,0,0,0,30)** to align the jaw axes with the tool coordinate system.