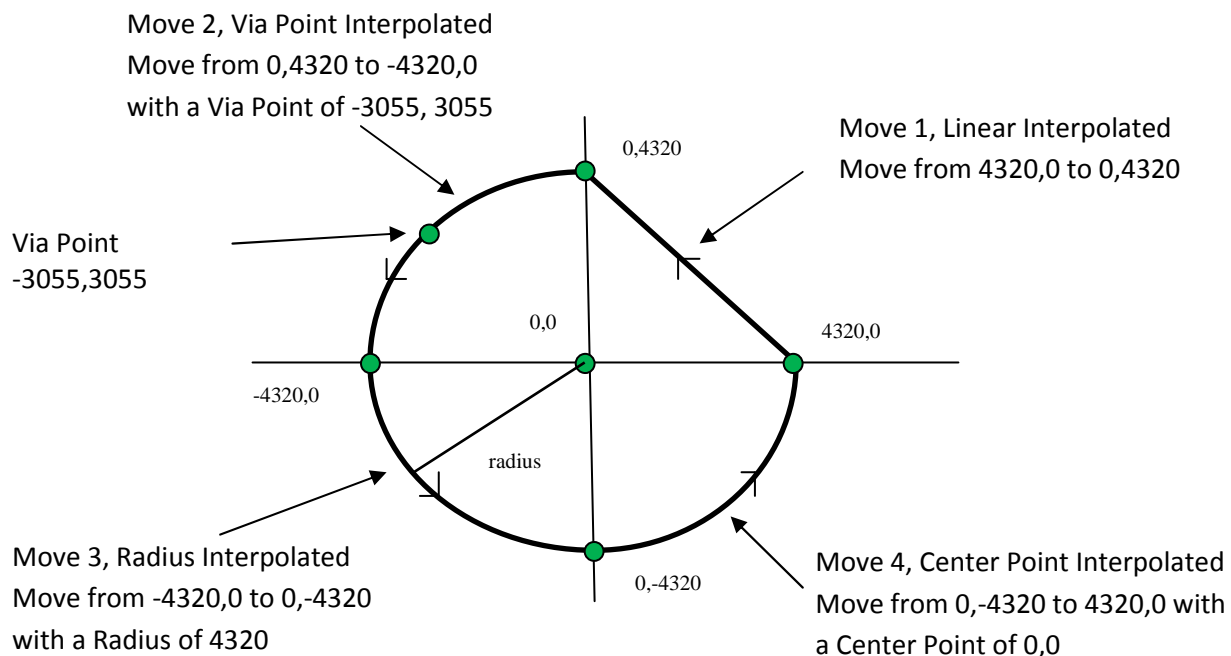The ANF2E sample program contains two subroutines, named INTERPOLATED_ABSOLUTE and INTERPOLATED_RELATIVE, which demonstrate how to perform interpolated moves. Both subroutines show how to perform the same four move types (Linear, Via Point, Radius, and Center Point). However, subroutine INTERPOLATED_ABSOLUTE performs the moves as a series of absolute moves while subroutine INTERPOLATED_RELATIVE performs the moves as a series of relative moves.

The following diagram illustrates the moves using absolute coordinates. The same diagram is used for both absolute and relative moves. Please note that the data entered in the relative move commands will be relative to the starting point of each of the individual moves.

Move 2, Via Point Interpolated Move from 0,4320 to -4320,0 with a Via Point of -3055, 3055

Via Point -3055,3055

Move 1, Linear Interpolated Move from 4320,0 to 0,4320

0,4320

0,0

4320,0

-4320,0

radius

Move 3, Radius Interpolated Move from -4320,0 to 0,-4320 with a Radius of 4320

0,-4320

Move 4, Center Point Interpolated Move from 0,-4320 to 4320,0 with a Center Point of 0,0

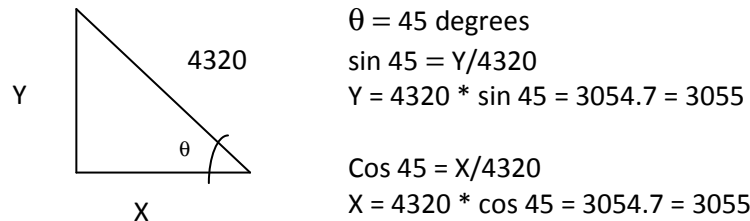**NOTE** Channel 1 defines the X position and Channel 2 defines the Y position

Absolute Moves

The position of both channels must be valid when performing Absolute Moves. That is, status bits ANF2E_Buffered[0].10 and ANF2E_Buffered[10].10 must be reset to zero. Also, for the moves to run correctly, they must be started when the current position of both channels is at their defined values.

Move 1: This is an Absolute Linear Interpolated move starting from a position of 4320,0 and ending at a position of 0,4320. This example uses a speed of 1000 steps / second and an acceleration and deceleration of 10 steps / milliseconds / second.

Move 2: This is an Absolute Via Point Interpolated move starting from a position of 0, 4320, ending at a position of -4320, 0, and using a Via Point of -3055, 3055.

The Via Point was selected as the 45 degree point along the desired arc. Any angle between 0 and 90 degrees, but not including 0 and 90 degrees, could have been selected.

θ = 45 degrees

sin 45 = Y/4320

Y = 4320 * sin 45 = 3054.7 = 3055

Cos 45 = X/4320

X = 4320 * cos 45 = 3054.7 = 3055

Because the Via Point is in the second quadrant, the X value will be negative and the Y value will be positive.

This example uses a speed of 1000 steps / second and an acceleration and deceleration of 10 steps / milliseconds / second.

Move 3: This is a CCW Absolute Radius Interpolated move starting from a position of -4320,0 and ending at a position of 0,-4320.

Radius = The radius of the defined arc. The sign of the radius determines if the move runs the shortest or longest arc between the starting and ending points. A positive radius will generate the shortest arc and a negative radius will generate the longest arc. In this case we want the shortest arc, so the radius will be a positive value of 4320.

This example uses a speed of 1000 steps / second and an acceleration and deceleration of 10 steps / milliseconds / second.

Move 4: This is a CCW Absolute Center Point Interpolated move starting from a position of 0,-4320 and ending at a position of 4320,0 and a center point of 0,0. This example uses a speed of 1000 steps / second and an acceleration and deceleration of 10 steps / milliseconds / second.

Relative Moves

Relative moves are defined relatively to the current position. That is, relative moves can be initiated from any point in the X-Y plane. To simplify this example, the center point of all of the following relative moves are assumed to be at location 0,0. Also, because they are Relative Moves, the position does not have to be valid. That is, it is possible to run a Relative Interpolated move even when status bits I:X.0/10 and I:X.8/10 are set.

Move 1: This is a Relative Linear Interpolated move starting from a position of 4320,0 and ending at a position of 0,4320. Because this is a Relative Move, the "X" target position will be -4320 and the "Y" target position is 4320. These were calculated in the following way.

Relative Distance = (Target Position – Starting Position)
X Distance = (0 – 4320) = - 4320
Y Distance = (4320 – 0) = 4320

This example uses a speed of 1000 steps / second and an acceleration and deceleration of 10 steps / milliseconds / second.
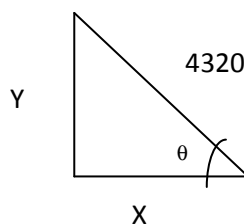
Move 2: This is a Relative Via Point Interpolated move starting from a position of 0, 4320 and ending at a position of -4320, 0, using a Via Point of -3055, 3055. The relative X and Y coordinates were calculated in the following way.

Relative Distance = (Target Position – Starting Position)
X Distance = (-4320 - 0) = - 4320
Y Distance = (0 - 4320) = -4320

The Via Point was selected as the 45 degree point along the desired arc. Any angle between 0 and 90 degrees, but not including 0 and 90 degrees, could have been selected.

$\theta = 45$ degrees
$\sin 45 = Y/4320$
$Y = 4320 * \sin 45 = 3054.7 = 3055$

$\cos 45 = X/4320$
$X = 4320 * \cos 45 = 3054.7 = 3055$

Because the Via Point is in the second quadrant, the absolute X value will be negative and the absolute Y value will be positive. As with the X and Y target position, the X and Y Via Points are relative to the starting point.

Relative Via Point = (Absolute Target Via Point – Starting Position)
X Via Point = (–3055 - 0) = -3055
Y Via Point = (3055 – 4320) = -1265

This example uses a speed of 1000 steps / second and an acceleration and deceleration of 10 steps / milliseconds / second.

Move 3: This is a Relative Radius Interpolated move starting from a position of -4320,0 and ending at a position of 0,-4320.

The relative X, Y, and Radius coordinates were calculated in the following way.

Relative Distance = (Target Position – Starting Position)
X Distance = (0 - -4320 = 4320
Y Distance = (0 - 4320) = -4320

Radius = The radius of the defined arc. The sign of the radius determines if the move runs the shortest or longest arc between the starting and ending point. A positive radius will generate the shortest arc and a negative radius will generate the longest arc. In this case we want the shortest arc, so the radius will be a positive value of 4320.

This example uses a speed of 1000 steps / second and an acceleration and deceleration of 10 steps / milliseconds / second.

Move 4: This is a Relative Center Point Interpolated move starting from a position of 0,-4320 and ending at a position of 4320,0 and a center point of 0,0.

The relative X, Y, and Center Point coordinates were calculated in the following way.

Relative Distance = (Target Position – Starting Position)
X Distance = (4320 - 0) = 4320
Y Distance = (0 - -4320) = 4320
Relative Center Point = (Target Center Point – Starting Position)
X Center Point = (0 – 0) = 0
Y Center Point = (0 - -4320) = 4320

This example uses a speed of 1000 steps / second and an acceleration and deceleration of 10 steps / milliseconds / second.