

The image features two large, thick black L-shaped brackets. One is positioned in the top-left corner, and the other is in the bottom-right corner. They are oriented towards each other, framing the central text.

INTERPOLATION

Chapter 22 & 29

Review

- Work Offsets replace the use of G92
- Newer machines use offsets to prevent having to complete large amounts of math
- TLO (Z) and Work offsets work together
- Can program many different offsets G54, G55, G59, G54.1 P1, G54.1 P48.....
- Z offset is not used in G54 but is required in G55 and above

Linear Interpolation

- G01 is the G code for linear interpolation
- Must always be accompanied by a F word....Feed.
- Linear interpolation is how the CNC moves across a straight line

Linear Interpolation

- Can be in X, Y, Z, A, B..... axis
- It can be done on three axis machines using all three axis at once but requires a large amount of math
- Differs from Linear motion in that all axis movements are combined to make a single straight line

Circular Interpolation

- Radius – line reference from the center point to any point on the circle
- Diameter – line reference from one point on the circle to another point on the circle that goes through the center point
- G code for Circular interpolation
 - *G02 will cut clockwise*
 - *G03 will cut Counterclockwise*
- MUST include the Plane identifier in safety line
 - *G17 on the XY, G18 on the XZ, G19 on the YZ plane*






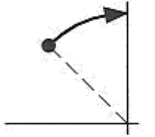



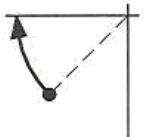
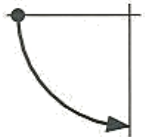
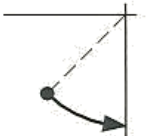

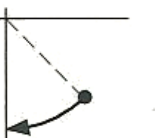
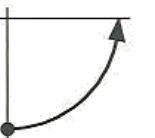

Circular Interpolation

- G code for Circular interpolation are modal and will stay in effect until replaced by another in their group
- Can use basic method which is the arc center and radius (will not cut full circles)
 - *Give / move to a start point for the arc*
 - *Use G02/3 with an end point and a radius*
 - *Can give a -(neg) R value to switch the orientation of the arc from fillet to concave contour*
 - *Must be careful of start and end points*

Circular Interpolation

- Can use the I, J, K method or Vectoring
 - *Reference page 247 to see vectoring quadrants and symbols*
 - *Vector I is the distance / direction from the start point of the arc to the center of the arc parallel to the X axis*
 - *Vector J is the distance / direction from the start point of the arc to the center of the arc parallel to the Y axis*
 - *Vector K is the distance / direction from the start point of the arc to the center of the arc parallel to the Z axis*
- G17 uses I and J – G18 Uses I and K – G19 Uses J and K

Circular Interpolation

	G02		G03	
Quadrant I				
	I0 J-	I- J-	I- J0	I- J-
Quadrant II				
	I+ J0	I+ J-	I0 J-	I+ J-
Quadrant III				
	I0 J+	I+ J+	I+ J0	I+ J+
Quadrant IV				
	I- J0	I- J+	I0 J+	I- J+

Circle Cutting Cycle

- Some controls have a cutting cycle specifically for circles (pockets)
- Most use a G12 and G13
 - *12 for CW - 13 for CCW*
- Must start at the center of the pocket
- There are many differences between models and you must check prior to programming

Feed Rate Compensation

- Being the tool must be moved farther or shorter distances feed rate must be adjusted
- Most CAM software compensates for this but...
- Outside of a circle = $\text{Feed} \times (\text{outside radius} + \text{cutter radius}) / \text{Outside radius}$
- Inside of a circle = $\text{Feed} \times (\text{inside radius} + \text{cutter radius}) / \text{Inside radius}$

Homework

- Programming examples on FlashCut
- Use lab computers to complete

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