



# SNS COLLEGE OF TECHNOLOGY

(AN AUTONOMOUS INSTITUTION)

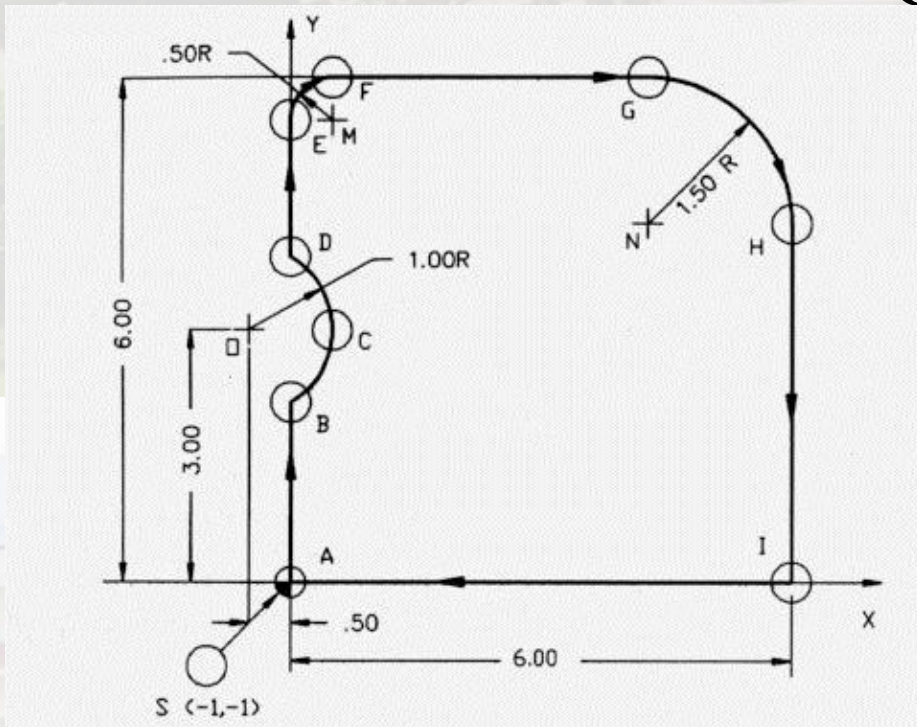


## Department of Mechanical Engineering

### CAD/CAM and Automation

### Unit – III

### CNC Interpolation



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# CNC interpolation



- **Interpolation** is a method of constructing new data points within the range of a discrete set of known data points.
- Estimation of an unknown quantity between two known quantities .It is a mathematical process to determine new points on curved surface within two end points.
- It produces a series of intermediate data points between given coordinate positions and computes the axial velocity of an individual axis along the contour path.



# Types of Interpolation

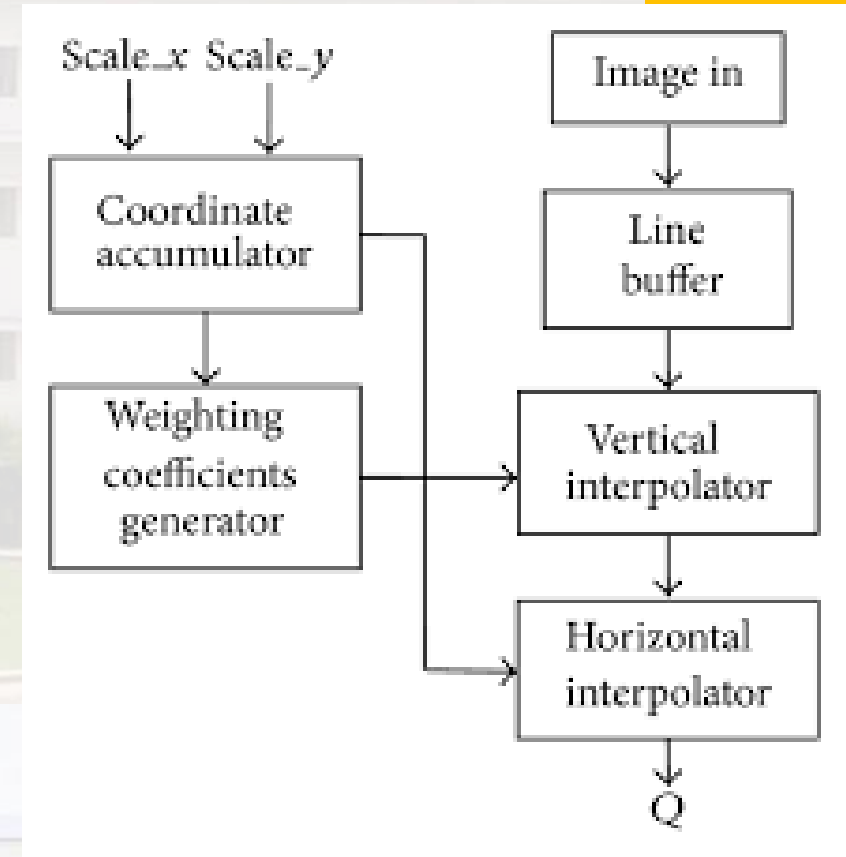


- **Linear interpolation:** This moves tool from start point to the target point along a straight line. It can be implemented in a 2-D plane or 3-D space. the programming command should indicate X, Y, Z coordinates of target point, and feed rate.
- **Circular interpolation:** It is programmed to cut circular arcs in three principal planes; namely XY, YZ, ZX. Direction, target position, arc radius, cutting plane, and feed rate must be specified in the program.
- **Helical interpolation:** Helical interpolation combines the two-axis circular interpolation with a linear interpolation in third axis. i.e. machining of helical pockets and threats.



# Hardware Interpolation

- It consists of a pair of DDA integrators.
- It is capable of doing linear and circular operations according to instruction from the punched tapes.
- The main feature of hardware interpolation is that it controls simultaneously two axes which can be X and Y, X and Z or Y and Z.
- Hardware circuits generate the points that keep the tool path within tolerance.
- It is used for fine interpolation.



<https://tinyurl.com/y8wulu52>



# Software Interpolation



- This is the computer based approach of hardware interpolation.
- Basically it is a computer program which simulates a single cycle of hardware interpolator and the feed rate control.
- The computer analysis program divides the tool path into segments.
- Used for coarse(rough) interpolation.
- It is microprocessor based interpolation system, samples about 100 times/second are to be taken in this system.



# Features of CNC

- For a CNC machine control unit (MCU) decides cutting speed, feed, depth of cut, tool selection, coolant on off and tool paths.
- The MCU issues commands in form of numeric data to motors that position slides and tool accordingly.
- The tool or material moves.
- Tools can operate in 1-5 axes.[multi axis machining]
- Larger machines have a machine control unit (MCU) which manages operations
- Movement is controlled by a motors .
- Feedback is provided by sensors.



# Assessment



<https://create.kahoot.it/share/quiz-on-csg/5929c3cf-6a07-427d-ad01-23cc06ac1b38>



THANK YOU