DESIGN OF DISCRETE-TIME SLIDING MODE CONTROLLER FOR TWO-WHEELED MOBILE ROBOT

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INTRODUCTION -

- A two-wheeled mobile robot is a robot that is capable of locomotion and having two main wheels with one caster wheel

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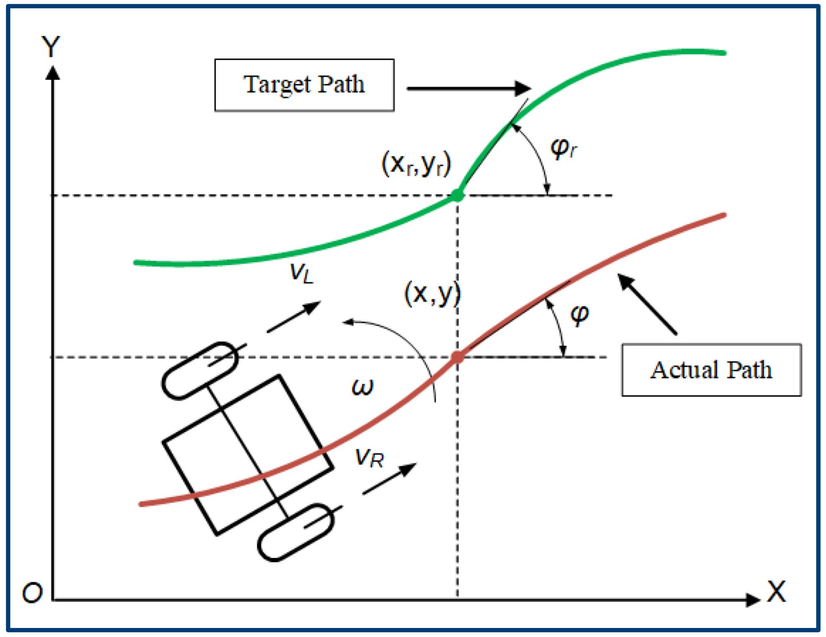
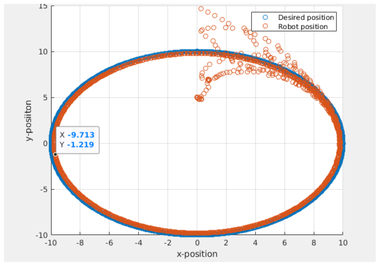
- Mobile robots can be autonomous (AMR-autonomous mobile robot) or can rely on guidance devices that allow them to travel a predefined navigation route in relatively controlled space (AGV - autonomous guided vehicle).

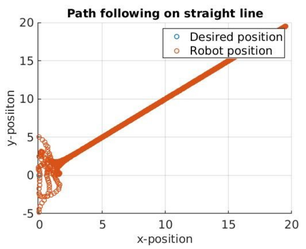
- These are being used in Security and Defence , Logistics , inspection and Maintenance , Agriculture , Cleaning , Nuclear sector , Urban Transport ,etc



Path following mobile Robot



Circular path followed by mobile robot



Linear path followed by mobile robot

DESIGN OF SLIDING MODE CONTROLLER

A discrete-time sliding mode controller (DT SMC) is designed for two-wheeled mobile robot for path following using position and velocity models given in [1] . The position model makes it possible to follow a desired trajectory while the velocity model helps to follow the optimal speed for a given trajectory . The DT SMC is simulated in simulink and the results of which are shown above.

DESIGN INNOVATION CENTRE
IIT ROORKEE

References -

[1] Paulo Coelho and Urbano Nunes , "Path-Following Control of Mobile Robots in Presence of Uncertainties"

[2] S. Chakrabarty and B. Bandyopadhyay ,"Minimum Ultimate Band Design of Discrete Sliding Mode Control"