Universidad Rey Juan Carlos

Mobile Robotics (I). Vacuum Cleaner.

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Introduction.

In this project we will develop how a vacuum cleaner should behave, using only bumpers (sensors) and motors (actuators).

To do it, we will program two parts, random movement and pseudorandom movement.

All vacuum software architecture is capsuled into a state machine.

Random movement.

In this case, our vacuum cleaner will work with three states in the main loop:

FW

This state represents the going forward movement, it makes the robot move in a straight line until a bumper registers a collision.

If that happens, we transit to "BACK" state.

BACK

Same logic behind this state, but instead of moving forward, it moves back during 2 seconds, then transits to "TURN" state.

Also, bumper collision data is saved to turn clockwise or anticlockwise.

TURN

The robot turns around itself for 1 to 4 seconds (chosen randomly every transition), and then transits to "FW" state.

Pseudorandom movement.

Here, our robot it's provided with some complexity. As pseudorandom behaviour, we include a spiral movement during the first state.
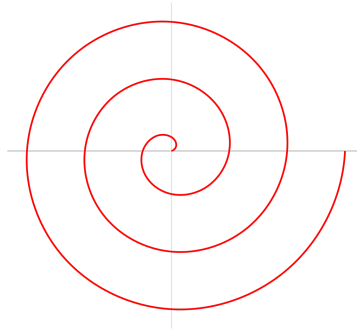
INIT

Fig 1. Simulates Archimedes spiral to cover more ground.

This happens at the beginning of the execution, and it works until a bumper detects collision, then it transits to random movement.

Here bumper data is also saved to know the turn orientation.