Robotics simulators Comparison

https://en.m.wikipedia.org/wiki/Robotics_simulator

Gazebo Tutorials:

http://gazebosim.org/tutorials

Tutorial: Using Gazebo plugins with ROS

http://gazebosim.org/tutorials?tut=ros_gzplugins

Adding Plugins- Example

Plugins can be added to any of the main elements of a URDF - a `<robot>`, `<link>`, or `<joint>` depending on what the scope and purpose of the plugin is. To accomplish adding a plugin to a particular element in your URDF, you must wrap your `<plugin>` tag within a `<gazebo>` element.

Adding a plugin to the `<robot>` element

The following is an example of a plugin for a `<robot>` element in a URDF:

```
<gazebo>
  <plugin name="differential_drive_controller"
filename="libdiffdrive_plugin.so">
    ... plugin parameters ...
  </plugin>
</gazebo>
```

In the above example the plugin was added to the `<robot>` element because, similar to other `<gazebo>` elements and properties, if no `reference="x"` is specified it is assumes the reference is the entire `<robot>`. In [SDF](#) terminology, it assumes the reference is the `<model>`.

Differential Drive

Description model plugin that provides a basic controller for differential drive robots in Gazebo. You need a well defined differential drive robot to use this plugin.

```
<gazebo>
```

```xml
    <plugin name="differential_drive_controller"
filename="libgazebo_ros_diff_drive.so">
      <alwaysOn>true</alwaysOn>
      <updateRate>${update_rate}</updateRate>
      <leftJoint>base_link_right_wheel_joint</leftJoint>
      <rightJoint>base_link_left_wheel_joint</rightJoint>
      <wheelSeparation>0.5380</wheelSeparation>
      <wheelDiameter>0.2410</wheelDiameter>
      <torque>20</torque>
      <commandTopic>cmd_vel</commandTopic>
      <odometryTopic>odom</odometryTopic>
      <odometryFrame>odom</odometryFrame>
      <robotBaseFrame>base_footprint</robotBaseFrame>
    </plugin>
</gazebo>
```