For Pioneer robots, the maximum speed that each wheel/actuator can possibly reach is limited to . However, this actuator nonlinearity was not taken into consideration during the design of the controller. In order for the radius of curvature of the trajectory described by a robot with such an actuator nonlinearity to remain the same as that with a linear actuator, the speed command generated by the robot controller must undergo the following transformation before being fed to the actuators.

**Proof**:

Consider the differential robot drive robot model

Before transformation, the radius of curvature of the trajectory is

where,

Since

and

After the transformation, the radius of curvature of the trajectory is

Substituting the transformation formulas into the above formula, it can be easily seen that

Hence, the radius of curvature is preserved by this transformation.