

# Phriky-Units

Physical Unit Inconsistency Detection Tool for ROS

<https://github.com/unl-nimbus-lab/phriky-units>

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- No programmer annotations.
- **87.0% True Positive** rate for ‘high-confidence’ inconsistencies
- *Best Tool Demonstration – ISSTA 2017*



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**Nebraska**  
Lincoln

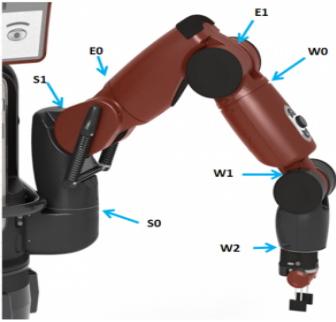
*Supported by:*

NSF awards #1638099 and #1526652

John-Paul Ore  
Carrick Detweiler  
Sebastian Elbaum

# Phriky-Units

Physical Unit Inconsistency Detection Tool for ROS



Rethink Robotics



AnyMal ETHZ



Clearpath



NIMBUS Lab UNL

kg   m   s   A   K   kg m<sup>2</sup>s<sup>-2</sup>   kg m s<sup>-2</sup>   kg m<sup>2</sup>s<sup>-2</sup>

# Phriky-Units

```
189 float computeDistance(geometry_msgs::Pose goal, geometry_msgs::Pose current)
190 {
191     float dist = sqrt((goal.position.x - current.position.x)*(goal.position.x - current.position.x)
+ (goal.position.y - current.position.y) + (goal.position.y - current.position.y)
+ (goal.position.z - current.position.z) + (goal.position.z - current.position.z));
```



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```
189 float computeDistance(geometry_msgs::Pose goal, geometry_msgs::Pose current)
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191     float dist = sqrt((goal.position.x - current.position.x)*(goal.position.x - current.position.x)
+ (goal.position.y - current.position.y) + (goal.position.y - current.position.y)
+ (goal.position.z - current.position.z) + (goal.position.z - current.position.z));
```

.....meters-squared

.....meters

# Phriky-Units

```
736 void callback (const geometry_msgs::Twist &msg) {
737 // TODO: fix this it is ugly!!
738 // (divide ground truth from GPS!!)
739     if (! enableAbsoluteError) {
740         current_position.x = msg->linear.x;
741         current_position.y = msg->linear.y;
742         current_position.z = msg->linear.z;
743     }
744     desired_position.x = msg->angular.x;
745     desired_position.y = msg->angular.y;
746     desired_position.z = msg->angular.z;
747 }
```



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**Monday 10:30 AM - Room# 223**

*Dimensional Inconsistencies in Code and ROS  
Messages: a Study of 5.9M Lines of Code*

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