

PathPlannerLib

LabVIEW

Reference

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Introduction

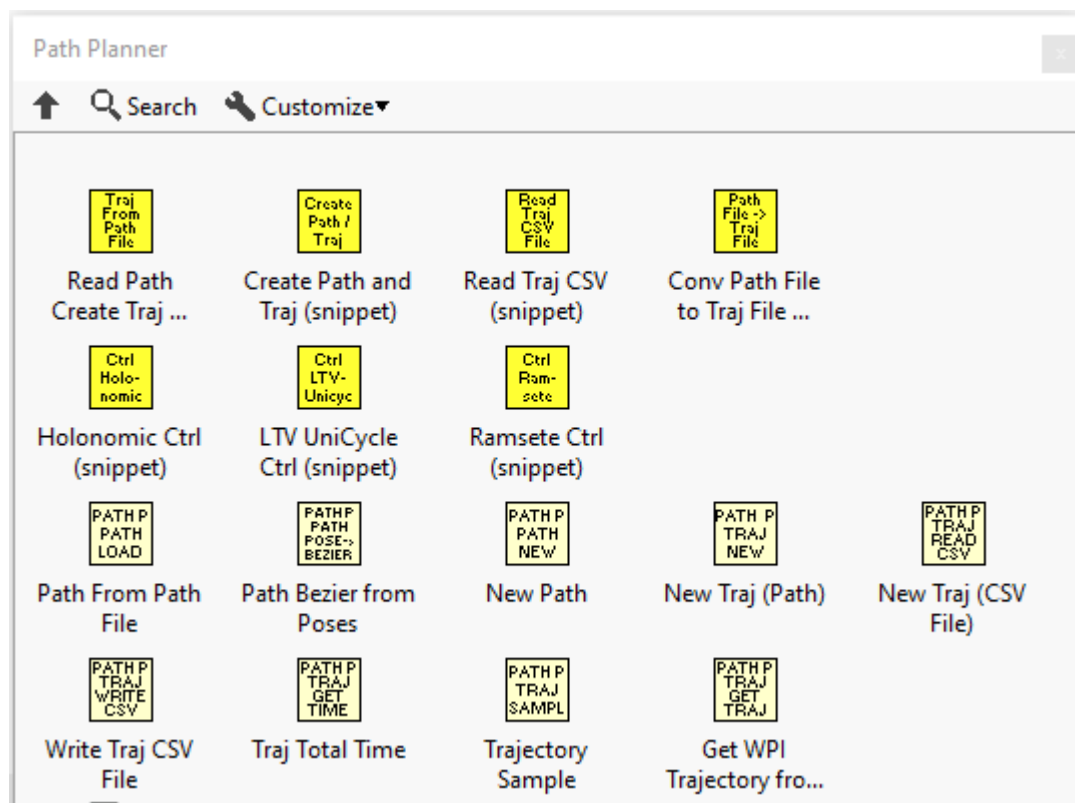
The PathPlanner LabVIEW library provides utility functions to read, create, and follow PathPlanner paths.

The library source code, package build specifications, and test package can be found here

<https://github.com/jsimpso81/PathPlannerLabVIEW>

Function Menus

A PathPlanner function palette contains the PathPlanner functions and type definitions. This palette can be accessed from the WPI Robotics Library Third Party palette.



Function Help

Each VI includes help that can be accessed using the standard LabVIEW help toggle (Ctrl H).

Context Help

PathPlanner24.lvlib:PathPlanner_Ctrl_HolonomicDrvExecute.vi

HOLONOMIC_CTRL_PACK_TUNING

Tolerance SI

Current Pose SI

PathPlannerState

Robot Parameters

Enabled

Reset

Period

calcChassisSpeed

At Reference

Position Error M

outHOLONOMIC_DRV_CTRL

Calculates the next output of the path following controller for holonomic drive robots. This wraps a Holonomic Drive Control function with the particulars needed to follow a PathPlanner trajectory.

Inputs:

- Holonomic_Ctrl_Pack_Tuning - cluster - The tuning parameters for the holonomic drive controller. These are static. They should not be changed after the first call to this function.
- Tolerance SI - pose2d - The values used to calculate "At Reference". These are in SI units.
- CurrentPoseSi - pose2d - The current pose calculated by odometry or pose estimation. The pose can be absolute or relative depending on what type of trajectory is being followed.
- PathPlannerState - cluster - The path planner trajectory state containing the desired position and velocities of the robot.
- RobotParams - cluster - Contains details about the robot needed to control the chassis speed. These include:
 - The max speed of a drive module in meters/sec
 - The radius of the drive base in meters. For swerve drive, this is the distance from the center of the robot to the furthest module. For mecanum, this is the drive base width / 2
- Enabled - boolean - When TRUE, closed loop control is enabled. (Optional. Default: TRUE)
- Reset - boolean - When TRUE the holonomic drive controller is reset. This should be set to TRUE for the first execution of a trajectory.
- Period - double - The loop period in seconds for this controller. (Optional. Default: 0.020)

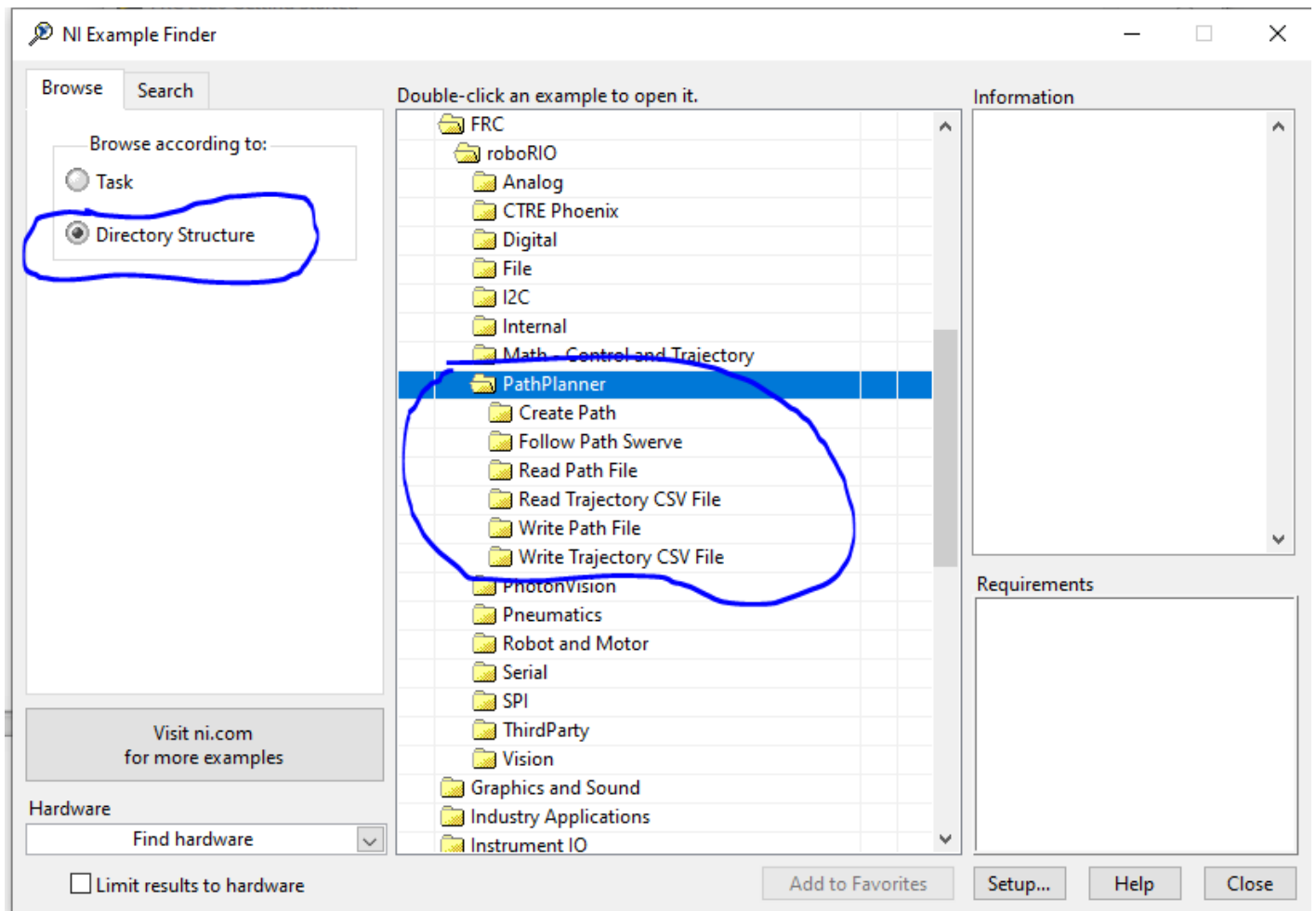
Outputs:

- CalcChassisSpeed - cluster - The desired chassis speed in SI units.
- AtReference - boolean - TRUE if the robots position is within the defined tolerance.
- PositionError - pose2d - Position error in SI units. How far the robot is away from the desired trajectory position.
- out_Holonomic_Drive_Ctrl - The current holonomic drive controller data cluster. This is mainly for diagnostic purposes.

Function Examples

NOTE – Currently the LabVIEW find examples is NOT supported by the examples. The examples are provided as a separate ZIP file. Unzip the files to an empty directory.

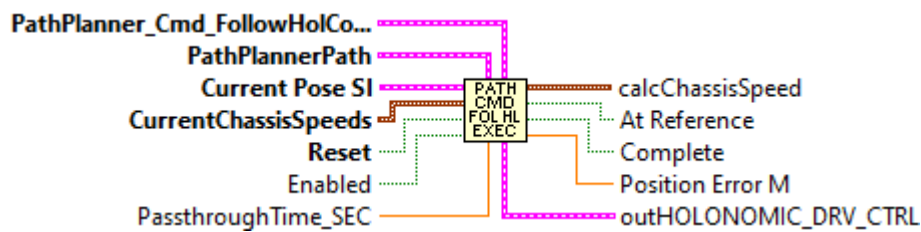
~~Many of the functions have examples that can be found under the LabVIEW "Find examples..." function. (Help -> Find Examples...). The function examples are easiest to find when "Directory Structure" is selected.~~



Function Groups

Cmd

PathPlanner_Cmd_FollowHolonomicPathExecute



DOCUMENTATION IS NOT COMPLETE.

Calculates the next output of the path following controller for holonomic drive robots. This wraps a Holonomic Drive Control function with the particulars needed to follow a PathPlanner trajectory.

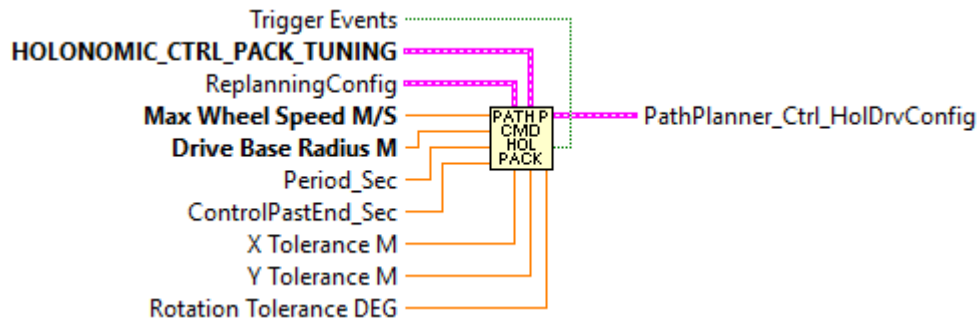
Inputs:

- PathPlanner_Holonomic_Ctrl_Pack_Tuning - cluster - The tuning parameters for the holonomic drive controller. These are static. They should not be changed after the first call to this function.
- CurrentPoseSi - pose2d - The current pose calculated by odometry or pose estimation. The pose can be absolute or relative depending on what type of trajectory is being followed.
- PathPlannerState - cluster - The path palnner trajectory state containing the desired position and velocities of the robot.
- Reset - boolean - When TRUE the holonomic drive controller is reset. This should be set to TRUE for the first execution of a trajectory.
- Enabled - boolean - When TRUE, closed loop control is enabled. (Optional. Default: TRUE)
- Period - double - The loop period in seconds for this controller. (Optional. Default: 0.020)

Outputs:

- CalcChassisSpeed - cluster - The desired chassis speed in SI units.
 - AtReference - boolean - TRUE if the robots position is within the defined tolerance.
 - PositionError - pose2d - Position error in SI units. How far the robot is away from the desired trajectory position.
 - out_Holonomic_Drive_Ctrl - THe current holonomic drive controller data cluster. This is mainly for diagnostic purposes.
-

PathPlanner_Cmd_FollowHolonomicPathPack



DOCUMENTATION IS NOT COMPLETE.

Pack controller tuning configuration for Path Planner Holonomic Drive Controller.

Inputs:

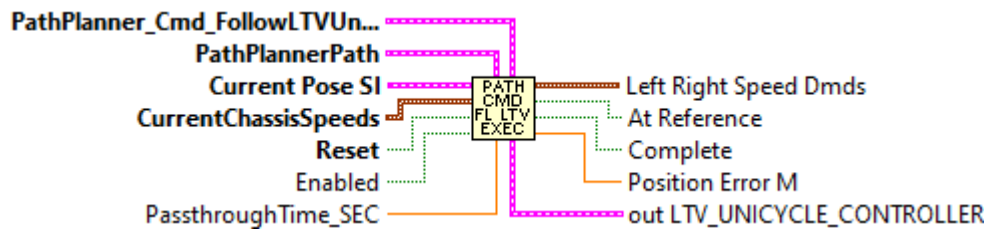
- X PID Tuning - cluster - Input from PACK PROF PID VI
- Y PID Tuning - cluster - Input from PACK PROF PID VI
- thetaController - cluster - A profiled PID controller to respond to error in angle.
- Max Wheel Speed M/S - double - Maximum wheel speed (M/S)
- DriveBaseRadius - double - The radius of the drive base in meters. For swerve drive, this is the distance from the center of the robot to the furthest module. For mecanum, this is the drive base width / 2
- X Tolerance - double - X tolerance for calculating At Reference (Meters) (Optional. Default: 0.0762)
- Y Tolerance - double - Y tolerance for calculating At Reference (Meters) (Optional. Default: 0.0762)
- Rotation Tolerance - double - Rotation tolerance for calculating At Reference (Degrees) (Optional. Default: 0.0873)

Outputs:

- PathPlannerHolCtrlConfig -- cluster - packed controller configuration.



PathPlanner_Cmd_FollowLTVUnicyclePathExecute



DOCUMENTATION IS NOT COMPLETE.

Calculates the next output of the path following controller for holonomic drive robots. This wraps a Holonomic Drive Control function with the particulars needed to follow a PathPlanner trajectory.

Inputs:

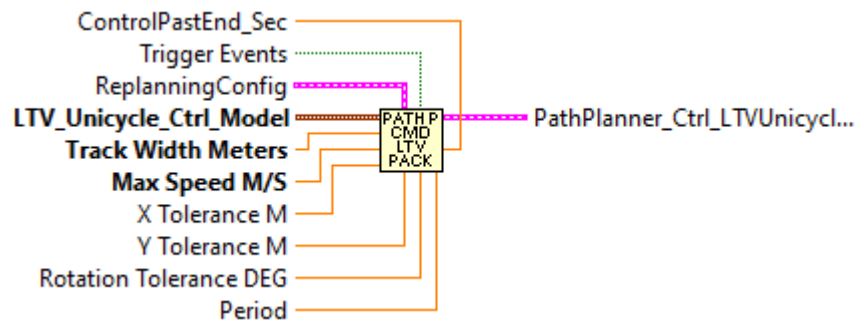
- PathPlanner_Holonomic_Ctrl_Pack_Tuning - cluster - The tuning parameters for the holonomic drive controller. These are static. They should not be changed after the first call to this function.
- CurrentPoseSi - pose2d - The current pose calculated by odometry or pose estimation. The pose can be absolute or relative depending on what type of trajectory is being followed.
- PathPlannerState - cluster - The path planner trajectory state containing the desired position and velocities of the robot.
- Reset - boolean - When TRUE the holonomic drive controller is reset. This should be set to TRUE for the first execution of a trajectory.
- Enabled - boolean - When TRUE, closed loop control is enabled. (Optional. Default: TRUE)
- Period - double - The loop period in seconds for this controller. (Optional. Default: 0.020)

Outputs:

- CalcChassisSpeed - cluster - The desired chassis speed in SI units.
- AtReference - boolean - TRUE if the robots position is within the defined tolerance.
- PositionError - pose2d - Position error in SI units. How far the robot is away from the desired trajectory position.
- out_Holonomic_Drive_Ctrl - The current holonomic drive controller data cluster. This is mainly for diagnostic purposes.



PathPlanner_Cmd_FollowLTVUnicyclePathPack



DOCUMENTATION IS NOT COMPLETE.

Pack controller tuning configuration for Path Planner Holonomic Drive Controller.

Inputs:

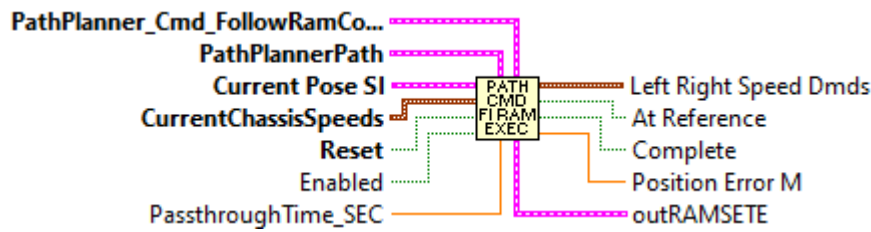
- X PID Tuning - cluster - Input from PACK PROF PID VI
- Y PID Tuning - cluster - Input from PACK PROF PID VI
- thetaController - cluster - A profiled PID controller to respond to error in angle.
- Max Wheel Speed M/.S - double - Maximum wheel speed (M/S)
- DriveBaseRadius - double - The radius of the drive base in meters. For swerve drive, this is the distance from the center of the robot to the furthest module. For mecanum, this is the drive base width / 2
- X Tolerance - double - X tolerance for calculating At Reference (Meters) (Optional. Default: 0.0762)
- Y Tolerance - double - Y tolerance for calculating At Reference (Meters) (Optional. Default: 0.0762)
- Rotation Tolerance - double - Rotation tolerance for calculating At Reference (Degrees) (Optional. Default: 0.0)873)

Outputs:

- PathPlannerHolCtrlConfig -- cluster - packed controller configuration.



PathPlanner_Cmd_FollowRamsetePathExecute



DOCUMENTATION IS NOT COMPLETE.

Calculates the next output of the path following controller for holonomic drive robots. This wraps a Holonomic Drive Control function with the particulars needed to follow a PathPlanner trajectory.

Inputs:

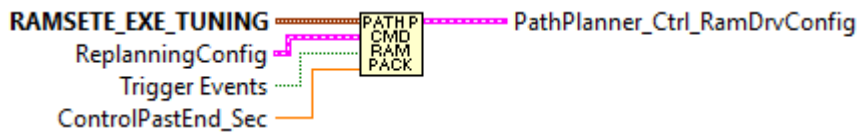
- PathPlanner_Holonomic_Ctrl_Pack_Tuning - cluster - The tuning parameters for the holonomic drive controller. These are static. They should not be changed after the first call to this function.
- CurrentPoseSi - pose2d - The current pose calculated by odometry or pose estimation. The pose can be absolute or relative depending on what type of trajectory is being followed.
- PathPlannerState - cluster - The path planner trajectory state containing the desired position and velocities of the robot.
- Reset - boolean - When TRUE the holonomic drive controller is reset. This should be set to TRUE for the first execution of a trajectory.
- Enabled - boolean - When TRUE, closed loop control is enabled. (Optional. Default: TRUE)
- Period - double - The loop period in seconds for this controller. (Optional. Default: 0.020)

Outputs:

- CalcChassisSpeed - cluster - The desired chassis speed in SI units.
- AtReference - boolean - TRUE if the robots position is within the defined tolerance.
- PositionError - pose2d - Position error in SI units. How far the robot is away from the desired trajectory position.
- out_Holonomic_Drive_Ctrl - The current holonomic drive controller data cluster. This is mainly for diagnostic purposes.



PathPlanner_Cmd_FollowRamsetePathPack



DOCUMENTATION IS NOT COMPLETE.

Pack controller tuning configuration for Path Planner Holonomic Drive Controller.

Inputs:

- X PID Tuning - cluster - Input from PACK PROF PID VI
- Y PID Tuning - cluster - Input from PACK PROF PID VI
- thetaController - cluster - A profiled PID controller to respond to error in angle.
- Max Wheel Speed M/.S - double - Maximum wheel speed (M/S)
- DriveBaseRadius - double - The radius of the drive base in meters. For swerve drive, this is the distance from the center of the robot to the furthest module. For mecanum, this is the drive base width / 2
- X Tolerance - double - X tolerance for calculating At Reference (Meters) (Optional. Default: 0.0762)
- Y Tolerance - double - Y tolerance for calculating At Reference (Meters) (Optional. Default: 0.0762)
- Rotation Tolerance - double - Rotation tolerance for calculating At Reference (Degrees) (Optional. Default: 0.0)873)

Outputs:

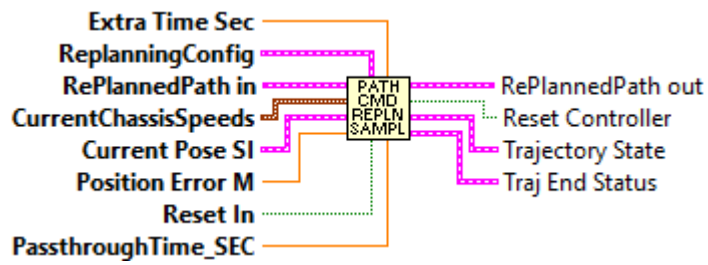
- PathPlannerHolCtrlConfig -- cluster - packed controller configuration.

PathPlanner_Cmd_Follow_Internal_InitEvents



This is an internal function. It is not to be called by end users.

PathPlanner_Cmd_Follow_Internal_Replan_Sample



This is an internal function. It is not to be called by end users.

PathPlanner_Cmd_Follow_Internal_TriggerEvents



This is an internal function. It is not to be called by end users.

CommandUtil

PathPlanner_CommandUtil_Equals



Determines if two Command definitions are equal

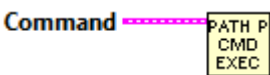
Inputs:

- Command - cluster - command definition
- Other Command - cluster - command definition

Outputs:

- Equal - boolean - TRUE if both definitions are the same.

PathPlanner_CommandUtil_Execute



Issues the given command.

Currently the only type of commands that can be issued are Boolean commands. The value is forced to TRUE when the command is issued.

The following table lists the actions performed for different types of commands:

- Unknown - nothing - not supported.
- Wait - nothing - not supported
- Named - Issue boolean command with TRUE value using the "name" as the command name.
- Path - nothing - not supported
- Sequential, Parallel, Race, Deadline - Issue boolean command with TRUE value for each of the commands contained in the "commands" array. The value for "name" is used as the command name.

Inputs:

- Command - cluster - Command definition.

Outputs:

--

PathPlanner_CommandUtil_TypeFromString

Type string  Type

Get the command utility type enum from a string

If the string is not a valid command type, then "Unknown" is used.

Inputs:

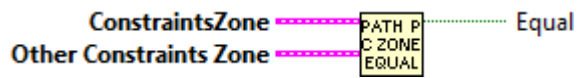
-- Type string - string - string to evaluate for command util type

Outputs:

-- type - enum - Evaluated command util type.

ConstraintsZone

PathPlanner_ConstraintsZone_Equals



Compares two Constraints Zone definitions

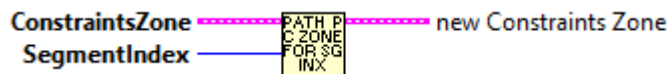
Inputs:

- ConstraintsZone - cluster - first definition to compare
- Other ConstraintsZone - cluster - other definition to compare

Outputs:

- Equal - boolean - TRUE if equal.

PathPlanner_ConstraintsZone_ForSegmentIndex



Transform the positions of this zone for a given segment number.

For example, a zone from [1.5, 2.0] for the segment 1 will have the positions [0.5, 1.0]

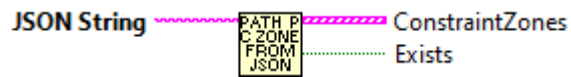
Inputs:

- ConstraintsZone - cluster - definition of zone
- segmentIndex - int - The segment index to transform positions for

Outputs:

- NewConstraintsZone - cluster - The transformed zone
-

PathPlanner_ConstraintsZone_FromJSON



Create a constraints zone from json

Inputs:

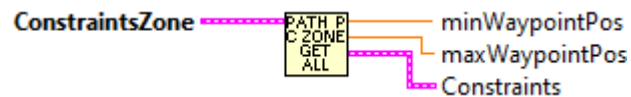
-- JsonString - string - String containing the JSON to parse.

Outputs:

-- ConstraintsZone - cluster - The constraints zone defined by the given json object

-- Exists -- boolean -- True if a constraints zone was found and parsed.

PathPlanner_ConstraintsZone_GetAll



Get the elements of the constraints zone cluster.

Inputs:

-- ConstraintsZone - cluster - Data structure containing constraints zone.

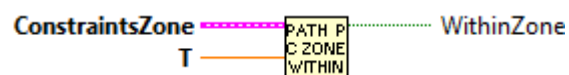
Outputs:

-- minWayPointPos - double - Waypoint relative starting position

-- maxWayPointPos - double - Waypoint relative end position

-- Constraints -- cluster -- Constraints to apply within this region.

PathPlanner_ConstraintsZone_IsWithinZone



Get if a given waypoint relative position is within this zone

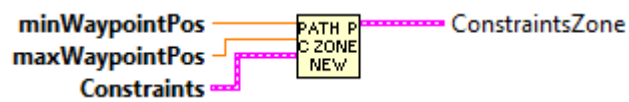
Inputs:

- ConstraintsZone -- cluster -- data structure containing zone definition.
- t - double - Waypoint relative position

Outputs:

- WithinZone - boolean - True if given position is within this zone

PathPlanner_ConstraintsZone_New



Create a new constraints zone

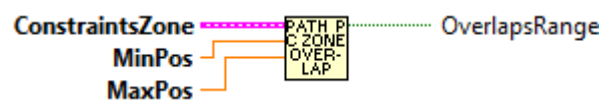
Inputs:

- minWaypointPos - double - Starting position of the zone
- maxWaypointPos - double - End position of the zone
- constraints - cluster - The constraints to apply within the zone

Outputs:

- ConstraintsZone - cluster - data cluster with constraint

PathPlanner_ConstraintsZone_OverlapsRange



Get if this zone overlaps a given range

Inputs:

- ConstraintsZone - cluster - zone definition.
- minPos - double - The minimum waypoint relative position of the range

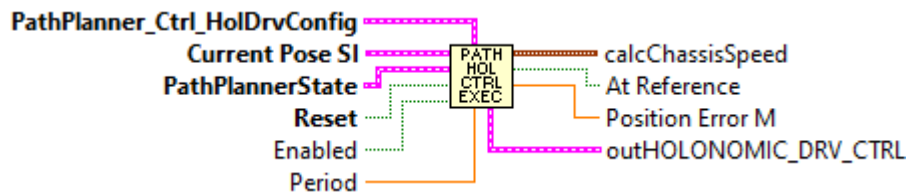
-- maxPos - double - The maximum waypoint relative position of the range

Outputs:

-- OverlapsRange - boolean - True if any part of this zone is within the given range

Ctrl

PathPlanner_Ctrl_HolonomicDrvExecute



Calculates the next output of the path following controller for holonomic drive robots. This wraps a Holonomic Drive Control function with the particulars needed to follow a PathPlanner trajectory.

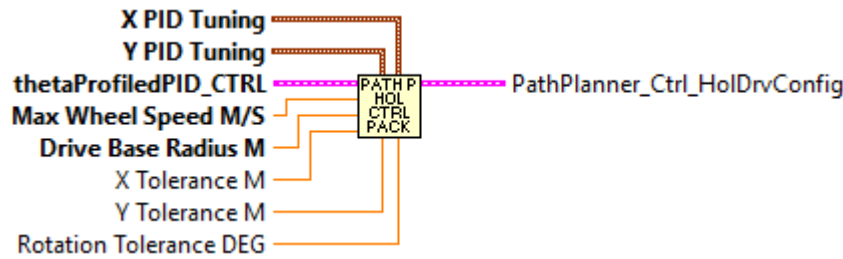
Inputs:

- PathPlanner_Holonomic_Ctrl_Pack_Tuning - cluster - The tuning parameters for the holonomic drive controller. These are static. They should not be changed after the first call to this function.
- CurrentPoseSi - pose2d - The current pose calculated by odometry or pose estimation. The pose can be absolute or relative depending on what type of trajectory is being followed.
- PathPlannerState - cluster - The path planner trajectory state containing the desired position and velocities of the robot.
- Reset - boolean - When TRUE the holonomic drive controller is reset. This should be set to TRUE for the first execution of a trajectory.
- Enabled - boolean - When TRUE, closed loop control is enabled. (Optional. Default: TRUE)
- Period - double - The loop period in seconds for this controller. (Optional. Default: 0.020)

Outputs:

- CalcChassisSpeed - cluster - The desired chassis speed in SI units.
 - AtReference - boolean - TRUE if the robots position is within the defined tolerance.
 - PositionError - pose2d - Position error in SI units. How far the robot is away from the desired trajectory position.
 - out_Holonomic_Drive_Ctrl - The current holonomic drive controller data cluster. This is mainly for diagnostic purposes.
-

PathPlanner_Ctrl_HolonomicDrvPack



Pack controller tuning configuration for Path Planner Holonomic Drive Controller.

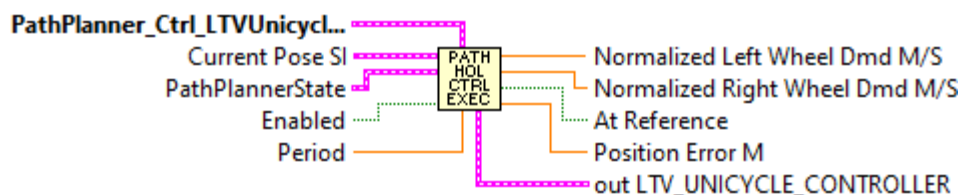
Inputs:

- X PID Tuning - cluster - Input from PACK PROF PID VI
- Y PID Tuning - cluster - Input from PACK PROF PID VI
- thetaController - cluster - A profiled PID controller to respond to error in angle.
- Max Wheel Speed M/S - double - Maximum wheel speed (M/S)
- DriveBaseRadius - double - The radius of the drive base in meters. For swerve drive, this is the distance from the center of the robot to the furthest module. For mecanum, this is the drive base width / 2
- X Tolerance - double - X tolerance for calculating At Reference (Meters) (Optional. Default: 0.0762)
- Y Tolerance - double - Y tolerance for calculating At Reference (Meters) (Optional. Default: 0.0762)
- Rotation Tolerance - double - Rotation tolerance for calculating At Reference (Degrees) (Optional. Default: 0.0873)

Outputs:

- PathPlannerHolCtrlConfig -- cluster - packed controller configuration.

PathPlanner_Ctrl_LTVUnicycleExecute



Calculates the next output of the path following controller for differential drive robots using a LTV (linear time varying) Unicycle controller. This wraps a LTV Control function with the particulars needed to follow a PathPlanner trajectory.

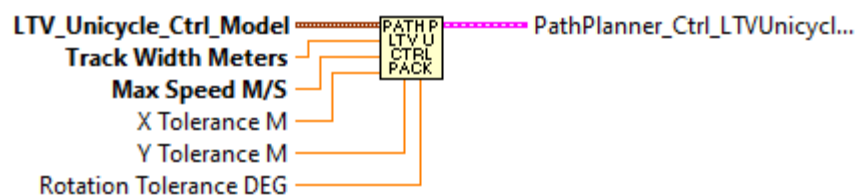
Inputs:

- PathPlanner_Ctrl_LTV_Unicycle_Ctrl_Config - cluster - Configuration from the PathPlanner_Ctrl_LTV_Unicycle_Pack_Config VI.
- CurrentPoseSi - pose2d - The current pose calculated by odometry or pose estimation. The pose can be absolute or relative depending on what type of trajectory is being followed.
- PathPlannerState - cluster - The path planner trajectory state containing the desired position and velocities of the robot.
- Enabled - boolean - When TRUE, closed loop control is enabled. (Optional. Default: TRUE)
- Period - double - The loop period in seconds for this controller. (Optional. Default: 0.020)

Outputs:

- NormalizedLeftWheelSpeedDmd - The desired speed for the left drive wheel in SI units. The left and right speeds have been normalized so not to exceed the maximum allowed speed.
- NormalizedRightWheelSpeedDmd - The desired speed for the right drive wheel in SI units. The left and right speeds have been normalized so not to exceed the maximum allowed speed.
- AtReference - boolean - TRUE if the robots position is within the defined tolerance.
- PositionError - double - Position error in SI units. How far the robot is away from the desired trajectory position.
- LTVUnicycle_Ctrl - cluster - controller data cluster. Primarily usefull for diagnostics.

PathPlanner_Ctrl_LTVUnicyclePack



Pack controller tuning configuration for Differential Drive LTV Unicycle Controller.

Inputs:

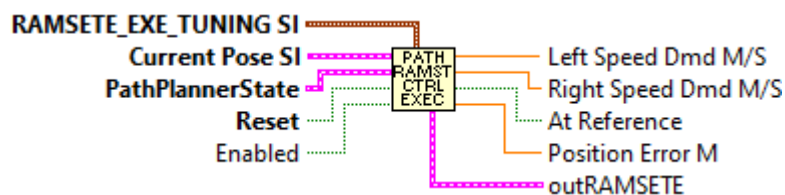
- LTV_Unicycle_Ctrl_Model - cluster - The modeling paraameters for the LTV drive controller. These are static. They should not be changed after the first call to this function.
- Track With - double - Track width (Meters)
- Max Wheel Speed M/.S - double - Maximum wheel speed (M/S)

- X Tolerance -- X tolerance for calculating At Reference (Meters) (Optional. Default: 0.0762)
- Y Tolerance -- Y tolerance for calculating At Reference (Meters) (Optional. Default: 0.0762)
- Rotation Tolerance -- Rotation tolerance for calculating At Reference (Degrees) (Optional. Default: 0.0873)

Outputs:

- PathPlannerLTVUnicycleCtrlConfig -- cluster - packed controller configuration.

PathPlanner_Ctrl_RamseteExecute



Calculates the next output of the path following controller for differential drive robots using a Ramsete controller. This wraps a Ramsete function with the particulars needed to follow a PathPlanner trajectory.

Inputs:

- Ramsete_Exe_Tuning_SI - cluster - The tuning parameters for the Ramsete drive controller. These are static. They should not be changed after the first call to this function.
- CurrentPoseSi - pose2d - The current pose calculated by odometry or pose estimation. The pose can be absolute or relative depending on what type of trajectory is being followed.
- PathPlannerState - cluster - The path palnner trajectory state containing the desired position and velocities of the robot.
- Reset - boolean - When TRUE, resets the Ramsete controller. This should be set to TRUE for the first sample of following any trajectory.
- Enabled - boolean - When TRUE, closed loop control is enabled. (Optional. Default: TRUE)

Outputs:

- NormalizedLeftWheelSpeedDmd - The desired speed for the left drive wheel in SI units. The left and right speeds have been normalized so not to exceed the maximum allowed speed.
- NormalizedRightWheelSpeedDmd - The desired speed for the right drive wheel in SI units. The left and right speeds have been normalized so not to exceed the maximum allowed speed.
- AtReference - boolean - TRUE if the robots position is within the defined tolerance.
- PositionError - double - Position error in SI units. How far the robot is away from the desired trajectory position.

- OutRamsete - cluster - Current Ramsete data cluster. Primarily for diagnostic purposes.

EventMarker

PathPlanner_EventMarker_Equals



Determines if two event markers are equal

Inputs:

- EventMarker - cluster - Data cluster
- OtherEventMarker - cluster - Data cluster

Outputs:

- Equal - boolean - TRUE if both event markers are equal

PathPlanner_EventMarker_FromJSON



Create a list of event markers from json string

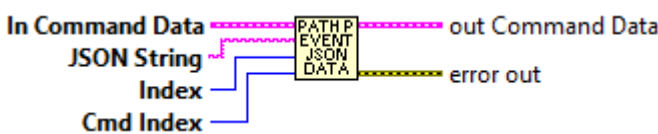
Inputs:

- JSONString - string - String potentially containing an event marker

Outputs:

- EventMarkers - array of cluster - The event markers defined by the given json object
- Exists - boolean- TRUE if any event markers were found in the JSON string.

PathPlanner_EventMarker_FromJSON_Data



Internal function to parse JSON data for Event Markers. This is data that is different for each different type of Event Marker command.

PathPlanner_EventMarker_GetCommand

in EventMarker  Command

Get the command associated with this marker


Inputs:

- EventMarker - cluster - Data cluster

Outputs:

- Command - cluster - command for this marker

PathPlanner_EventMarker_GetMinimumTriggerDistance

in EventMarker  minimumTriggerDistance

Get the minimum trigger distance for this marker

Inputs:

- EventMarker - cluster - Data cluster

Outputs:

- MinTriggerDistance - double - The minimum trigger distance in meters

PathPlanner_EventMarker_GetWaypointRelativePos

in EventMarker  WaypointRelativePos

Get the waypoint relative position of this marker

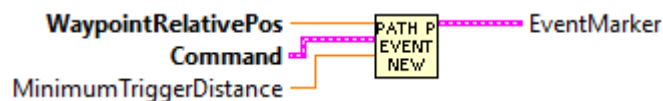
Inputs:

- EventMarker - cluster - Data cluster

Outputs:

- WaypointRelativePose - double - Waypoint relative position of this marker

PathPlanner_EventMarker_New



Create a new event marker. This describes a position along the path that will trigger a command when reached

Inputs:

- waypointRelativePos - double - The waypoint relative position of the marker
- command - cluster - The command that should be triggered at this marker
- minimumTriggerDistance - double - The minimum distance the robot must be within for this marker to be triggered (Optional. Default: 0.5)

Outputs:

- EventMarker - cluster - Data cluster

PathPlanner_EventMarker_Reset



Reset the current robot position

Inputs:

- EventMarker - cluster - Data cluster
- robotPose - pose2d - The current pose of the robot

Outputs:

- EventMarker - cluster - Data cluster

PathPlanner_EventMarker_SetMarkerPos



Get the marker position for this event

Inputs:

- EventMarker - cluster - Data cluster
- MarkerPos - double - Marker position

Outputs:

- EventMarker - cluster - Data cluster

PathPlanner_EventMarker_ShouldTrigger



Get if this event marker should be triggered

Inputs:

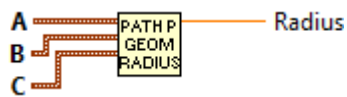
- EventMarker - cluster - Data cluster
- robotPose - pose2d - Current pose of the robot

Outputs:

- EventMarker - cluster - Data cluster
- Trigger - boolean - True if this marker should be triggered

GeomUtil

PathPlanner_GeomUtil_CalculateRadius



Calculate the curve radius given 3 points on the curve

Inputs:

- a - translation2d - Point A
- b - translation2d - Point B
- c - translation2d - Point C

Outputs:

- Radius - double - Curve radius

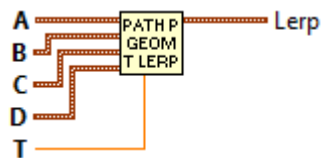
PathPlanner_GeomUtil_CoerceHeadingDegrees



PathPlanner_GeomUtil_CoerceHeadingRadians



PathPlanner_GeomUtil_CubicLerp



Cubic interpolation between Translation2ds

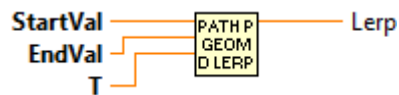
Inputs:

- a - translation2d - Position 1
- b - translation2d - Position 2
- c - translation2d - Position 3
- t - double - Interpolation factor (0.0-1.0)

Outputs:

- Lerp - translation2d - Interpolated value

PathPlanner_GeomUtil_DoubleLerp



Interpolate between two doubles

Inputs:

- startVal - double - Start value
- endVal - double - End value
- t - double - Interpolation factor (0.0-1.0)

Outputs:

- Lerp - double - Interpolated value

PathPlanner_GeomUtil_QuadraticLerp



Quadratic interpolation between Translation2ds

Inputs:

- a - translation2d - Position 1
- b - translation2d - Position 2
- c - translation2d - Position 3
- d - translation2d - Position 4
- t - double - Interpolation factor (0.0-1.0)

Outputs:

- Lerp - translation2d - Interpolated value

PathPlanner_GeomUtil_RotationLerp



Interpolate between two Rotation2ds

Inputs:

- startVal - rotation2d - Start value
- endVal - rotation2d - End value
- t - double - Interpolation factor (0.0-1.0)

Outputs:

- Lerp - rotation2d - Interpolated value

PathPlanner_GeomUtil_TranslationLerp



Inputs:

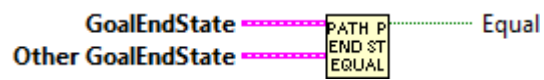
- a - translation2d - Position 1
- b - translation2d - Position 2
- t - double - Interpolation factor (0.0-1.0)

Outputs:

- lerp - translation2d - Interpolated value

GoalEndState

PathPlanner_GoalEndState_Equals



Determines if two Goal End State definitions are equal

Inputs:

- GoalEndState - cluster - goal end state definition
- Other GoalEndState - cluster - goal end state definition

Outputs:

- Equal - boolean - TRUE if both definitions are the same.
-

PathPlanner_GoalEndState_FromJSON



Create a goal end state from json

Inputs:

- JSON String - string - string to parse for GoalEndState

Outputs:

- GoalEndState - cluster - The goal end state defined by the given json. If not found, default is returned.
 - exists - boolean - TRUE if GoalEndState was found and parsed in the JSON string.
-

PathPlanner_GoalEndState_GetAll



Get the goal end velocity and end rotation

Inputs:

- GoalEndState - cluster - definition data structure

Outputs:

- Goal end velocity (M/S)
- Goal rotation

PathPlanner_GoalEndState_New



Describes the goal end state of the robot when finishing a path */

Create a new goal end state

Inputs:

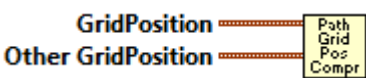
- velocity - double - The goal end velocity (M/S)
- rotation - rotation2d - The goal rotation

Outputs:

- GoalEndState - cluster - data structure

GridPosition

PathPlanner_GridPosition_CompareTo



PathPlanner_GridPosition_Equals



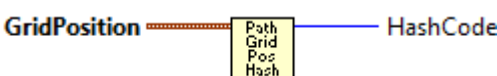
PathPlanner_GridPosition_FromHash



PathPlanner_GridPosition_Get



PathPlanner_GridPosition_HashCode



PathPlanner_GridPosition_New

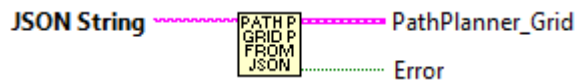


PathPlanner_GridPosition_Print



ObstacleGrid

PathPlanner_ObstacleGrid_FromJSON



Parse an obstacle grid from a JSON formatted string.

Inputs:

- JSON String - string- The string containing the obstacle grid definition.

Outputs:

- PathPlanner_ObstacleGrid - cluster - Obstacle grid read from JSON file.
- Error - boolean - TRUE if an error occurred.

PathPlanner_ObstacleGrid_ProcessNavFile



Load an obstacle grid from a JSON formatted file.

Inputs:

- filename - string - The name of the obstacle grid file. See notes below on file naming.

Outputs:

- PathPlanner_ObstacleGrid - cluster - Obstacle grid read from JSON file.
- Error out - cluster - Error cluster
- Full Filename - string - fully qualified file name.

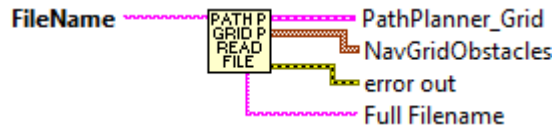
Notes on file naming:

- The file name must include the extension. ".json" is not automatically appended to the name.
- The file name can be a simple file or an absolute path. If a simple file name is used the default path on the RoboRIO is: "home:\lvuser\natinst\LabVIEW Data". On a Windows PC the default path is the

LabVIEW default directory. Normally this is: %HOMEDRIVE%%HOMEPATH%\Documents\LabView Data".

- Filenames on the RoboRIO, which runs Linux, are case sensitive.

PathPlanner_ObstacleGrid_ReadNavFile



Load an obstacle grid from a JSON formatted file.

Inputs:

- filename - string - The name of the obstacle grid file. See notes below on file naming.

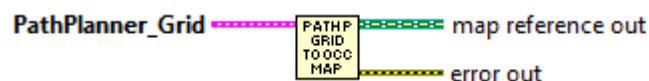
Outputs:

- PathPlanner_ObstacleGrid - cluster - Obstacle grid read from JSON file.
- Error out - cluster - Error cluster
- Full Filename - string - fully qualified file name.

Notes on file naming:

- The file name must include the extension. ".json" is not automatically appended to the name.
- The file name can be a simple file or an absolute path. If a simple file name is used the default path on the RoboRIO is: "home:\lvuser\natinst\LabVIEW Data". On a Windows PC the default path is the LabVIEW default directory. Normally this is: %HOMEDRIVE%%HOMEPATH%\Documents\LabView Data".
- Filenames on the RoboRIO, which runs Linux, are case sensitive.

PathPlanner_ObstacleGrid_ToOccupancyGrid



Converts a PathPlanner Obstacle Grid to a LabVIEW occumance map reference.

Inputs:

- PathPlanner_ObstacleGrid - cluster -- data to convert

Outputs:

- Map Reference Out -- reference -- Reference to Occupancy map for use by LabVIEW AD* pathfinding.
- Error out - cluster - Error cluster

Path

PathPlanner_Path_BezierFromPoses



Create the bezier points necessary to create a path using a list of poses

Inputs:

- poses - pose2d array - List of poses. Each pose represents one waypoint.

Outputs:

- Bezier - translation2d array - List of bezier points
- Error - boolean - TRUE if an error occurred. (Too few poses)

PathPlanner_Path_BezierFromWaypointsJSON



Parse bezier points from a JSON string formatted as waypoint.

Inputs:

- JSON String - string - JSON containing waypoint to parse and convert to bezier point array

Outputs:

- Bezier - array of translation2s - List of bezier points
 - error - boolean - TRUE if an error occurred.
 - value - array of cluster - bezier points -- for debugging
-

PathPlanner_Path_BezierToWaypoints



Convert bezier points to waypoints allowing them to be written to a JSON string.

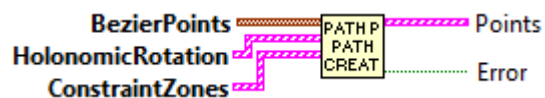
Inputs:

- Bezier - array of translation2s - List of bezier points

Outputs:

- waypoints - array of cluster - waypoints compatible with pathplanner path JSON strings.

PathPlanner_Path_CreatePath



Create the path points for this path. This is an internal function.

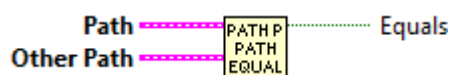
Inputs:

- BezierPoints - array of bezier oints
- HolonomicRotations - array of holonomic rotatios.
- ConstraintZones - array of constraint zones.

Outputs:

- PathPoints - PathPoint array - Array of points along the path
- Error - boolean - TRUE if an error occured.

PathPlanner_Path_Equals



Determines if two paths are identical.

Note: Reversed and PreviewEndState are not part of the comparison

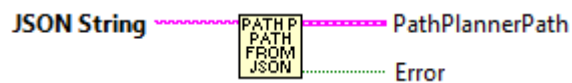
Inputs:

- Path Path - Data structure containing path definition
- OtherPath - Path - Data structure containing path definition

Outputs:

- Equal - boolean - TRUE if paths are identical.

PathPlanner_Path_FromJSON



Load a path from a JSON string.

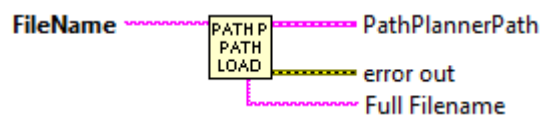
Inputs:

- JSON String - string- The string containing the path definition.

Outputs:

- Path - cluster - PathPlannerPath created from the given JSON string
- Error out - cluster - Error cluster

PathPlanner_Path_FromPathFile



Load a path from a path file in storage. The path normally has a .PATH extension. Internally this file is formatted as JSON.

Inputs:

- filename - string - The name of the path to load

Outputs:

- Path - cluster - PathPlannerPath created from the given file name
- Error out - cluster - Error cluster
- Full Filename - string - fully qualified file name.

Notes on file naming:

- The file name must include the extension. ".csv" is not automatically appended to the name.
- The file name can be a simple file or an absolute path. If a simple file name is used the default path on the RoboRIO is: "home:\lvuser\natinst\LabVIEW Data". On a Windows PC the default path is the LabVIEW default directory. Normally this is: %HOMEDRIVE%%HOMEPATH%\Documents\LabView Data".
- Filenames on the RoboRIO, which runs Linux, are case sensitive.

PathPlanner_Path_FromPathPnts



Create a path with pre-generated points. This should already be a smooth path.

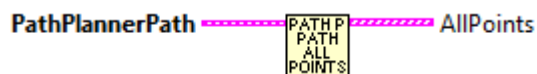
Inputs:

- pathPoints - Path points along the smooth curve of the path
- constraints - The global constraints of the path
- goalEndState - The goal end state of the path

Outputs:

- Path - cluster - A PathPlannerPath following the given pathpoints

PathPlanner_Path_GetAllPathPoint



Get all the path points in this path

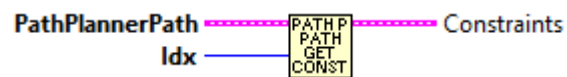
Inputs:

- Path - cluster - path definition data structure

Outputs:

- AllPoints - PathPoint array - Path points in the path

PathPlanner_Path_GetConstraintsForPoint



Get the constraints for a point along the path

Inputs:

- Path - cluster - path definition data structure
- idx - integer - Index of the point to get constraints for

Outputs:

- Constraints - cluster - The constraints that should apply to the point

PathPlanner_Path_GetCurveRadiusAtPoint



This is an internal function

Inputs:

- index
- Points

Outputs:

- Radius

PathPlanner_Path_GetEventMarkers



Get all the event markers for this path

Inputs:

- Path - cluster - path definition data structure

Outputs:

- EventMarkers - cluster - The event markers for this path

PathPlanner_Path_GetGlobalConstraints



Get the global constraints for this path

Inputs:

- Path - cluster - path definition data structure

Outputs:

- GlobalConstraints - cluster - Global constraints that apply to this path

PathPlanner_Path_GetGoalEndState



Get the goal end state of this path

Inputs:

- Path - cluster - path definition data structure

Outputs:

- GoalEndState - cluster - The goal end state

PathPlanner_Path_GetPoint



Get a specific point along this path

Inputs:

- Path - cluster - path definition data structure
- index - integer - Index of the point to get

Outputs:

- Point - PathPoint - The point at the given index

PathPlanner_Path_GetPreviewStartingHolonomicPose



Get the starting pose for the holonomic path based on the preview settings.

NOTE: This should only be used for the first path you are running, and only if you are not using an auto mode file. Using this pose to reset the robots pose between sequential paths will cause a loss of accuracy.

Inputs:

- Path - cluster - path definition data structure

Outputs:

- PreviewStartingPose - pose2d - Pose at the path's starting point

PathPlanner_Path_GetStartingDifferentialPose



Get the differential pose for the start point of this path

Inputs:

- Path - cluster - path definition data structure

Outputs:

- StartingDifferentialPose - pose2d - Pose at the path's starting point

PathPlanner_Path_HotReload



Hot reload the path. This is used internally.

Inputs:

- Path - cluster - path definition data structure
- JSON String - string - JSON string containing the new path to load

Outputs:

- Path - cluster - path definition data structure
- Error - boolean - TRUE if an error occurred.

PathPlanner_Path_IsReversed



Should the path be followed reversed (differential drive only)

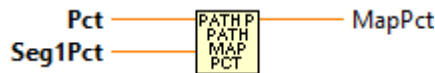
Inputs:

- Path - cluster - path definition data structure

Outputs:

- Reversed - boolean - True if reversed

PathPlanner_Path_MapPct



Map a given percentage/waypoint relative position over 2 segments This is an internal routine.

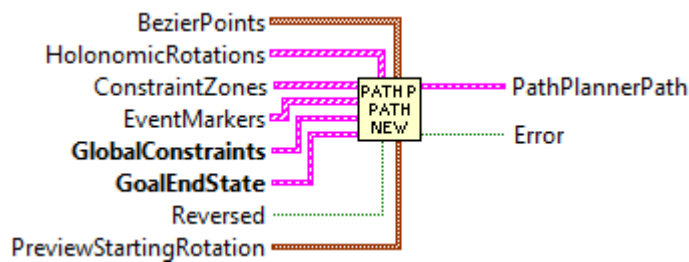
Inputs:

- pct - The percent to map
- seg1Pct - The percentage of the 2 segments made up by the first segment

Outputs:

- MapPct - The waypoint relative position over the 2 segments

PathPlanner_Path_New



Create a new path planner path

You likely want to use bezierFromPoses to create the bezier points.

Inputs:

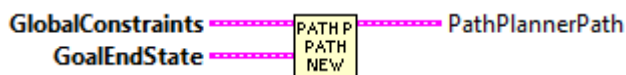
- bezierPoints - List of points representing the cubic Bezier curve of the path (Optional. Default: empty. Bezier points are necessary for creation of a valid path.)
- holonomicRotations - List of rotation targets along the path. (Optional. Default: empty)

- constraintZones - List of constraint zones along the path (Optional: Default: empty)
- eventMarkers - List of event markers along the path (Optional. Default: empty)
- globalConstraints - The global constraints of the path
- goalEndState - The goal end state of the path
- reversed - Should the robot follow the path reversed (differential drive only) (Optional. Default: false)
- previewStartingRotation - The settings used for previews in the UI (Optional. Default: 0)

Outputs:

- Path - cluster - path definition data structure

PathPlanner_Path_New_Empty



Creates an empty path data cluster. This is an INTERNAL function. Users should not call this.

Inputs:

- Global Constraints - cluster
- GoalEndState - cluster

Outputs:

- PathPlannerPath - cluster - empty path planner path data cluster.

PathPlanner_Path_NumPoints



Get the number of points in this path

Inputs:

- Path - cluster - path definition data structure

Outputs:

- NumPoints - integer - Number of points in the path

PathPlanner_Path_PositionDelta



This is an internal routine

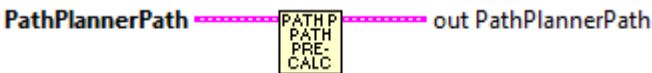
Inputs:

- A
- B

Outputs

- PosDelta

PathPlanner_Path_PreCalcValues



This is an internal routine.

Inputs:

- Path - cluster - path definition data structure

Outputs:

- Path - cluster - path definition data structure

PathPlanner_Path_RePlan



Replan this path based on the current robot position and speeds

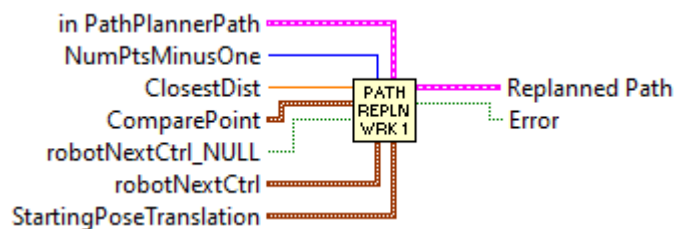
Inputs:

- Path - cluster - path definition data structure
- StartingPose - pose2d - New starting pose for the replanned path
- CurrentSpeeds - chassis speeds - Current chassis speeds of the robot

Outputs:

- RePlannedPath - cluster - path definition data structure
- Error - boolean - TRUE if an error occurred.

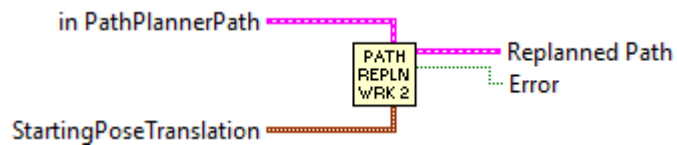
PathPlanner_Path_RePlan_Worker1



Replan path worker 1

Internal routine. Not for end user use.

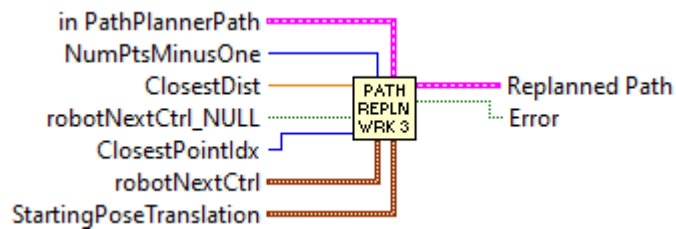
PathPlanner_Path_RePlan_Worker2



Replan path worker 2

Internal routine. Not for end user use.

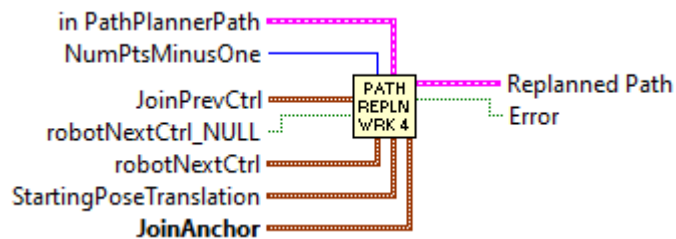
PathPlanner_Path_RePlan_Worker3



Replan path worker 3

Internal routine. Not for end user use.

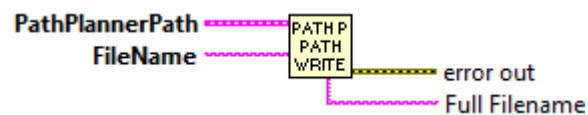
PathPlanner_Path_RePlan_Worker4



Replan path worker 4

Internal routine. Not for end user use.

PathPlanner_Path_ToPathFile



Write a path to a path file in storage. The path normally has a .PATH extension. Internally this file is formatted as JSON.

Inputs:

- Path - cluster - PathPlannerPath created from the given file name
- filename - string - The name of the path to write. Existing files will be overwritten.

Outputs:

- Error out - cluster - Error cluster

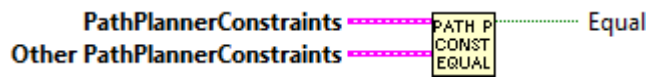
- Full Filename - string - fully qualified file name.

Notes on file naming:

- The file name must include the extension. ".csv" is not automatically appended to the name.
- The file name can be a simple file or an absolute path. If a simple file name is used the default path on the RoboRIO is: "home:\lvuser\natinst\LabVIEW Data". On a Windows PC the default path is the LabVIEW default directory. Normally this is: %HOMEDRIVE%%HOMEPATH%\Documents\LabView Data".
- Filenames on the RoboRIO, which runs Linux, are case sensitive.

PathConstraints

PathPlanner_PathConstraints_Equals



Determines if two Path Constraints definitions are nearly identical. The values have to be within 0.001 of each other.

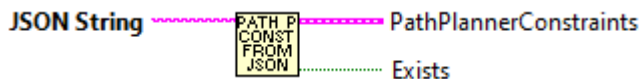
Inputs:

- `PathPlannerConstraints` - cluster - definition of path constraints
- `OtherPathPlannerConstraints` - cluster - definition of second path constraints for comparison

Outputs:

- `Equal` - boolean - TRUE indicates the provided definitions are nearly identical.

PathPlanner_PathConstraints_FromJSON



Create a path constraints object from json string

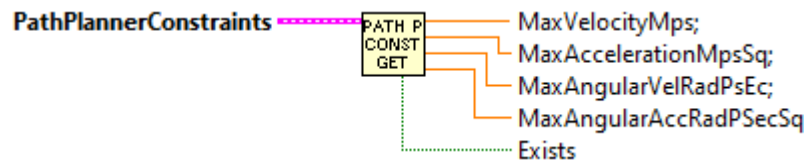
Inputs:

- `JSON String` - string - string potentially containing a path constraints definition

Outputs:

- `PathConstraint` - cluster - The path constraints defined by the given json
 - `Exists` - boolean - TRUE if the string contained a path constraints definition
-

PathPlanner_PathConstraints_GetAll



Get all elements of Path Constraints cluster

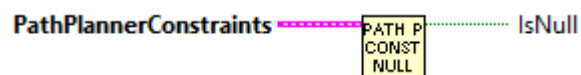
Inputs:

- PathConstraint - cluster - The path constraints to query

Outputs:

- maxVelocityMps - double - Max linear velocity (M/S)
- maxAccelerationMpsSq - double - Max linear acceleration (M/S²)
- maxAngularVelocityRps - double - Max angular velocity (Rad/S)
- maxAngularAccelerationRpsSq - double - Max angular acceleration (Rad/S²)
- exists - boolean - TRUE if this data cluster is not null.

PathPlanner_PathConstraints_IsNull



Return indication that the PathConstraints data definition isn't null (not defined)

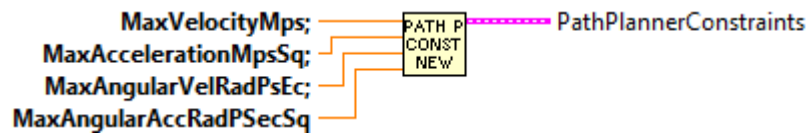
Inputs:

- PathPlannerConstraints - cluster - Path Constraints definition to evaluate.

Outputs:

- IsNull - boolean - TRUE if definition is NULL.
-
-

PathPlanner_PathConstraints_New



Create a new path constraints object

Inputs:

- maxVelocityMps - double - Max linear velocity (M/S)
- maxAccelerationMpsSq - double - Max linear acceleration (M/S²)
- maxAngularVelocityRps - double - Max angular velocity (Rad/S)
- maxAngularAccelerationRpsSq - double - Max angular acceleration (Rad/S²)

Outputs:

- PathConstraint - cluster - path constraint data

PathFinder

PathPlanner_PathFinder_ApplyAnchorSmooth



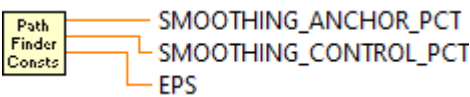
Internal function. Not to be used by end users.

PathPlanner_PathFinder_ApplyControlSmooth



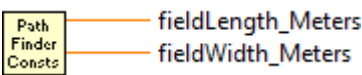
Internal function. Not to be used by end users.

PathPlanner_PathFinder_Constants



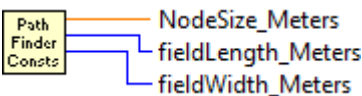
Internal function. Not to be used by end users.

PathPlanner_PathFinder_DefaultFieldSize



Internal function. Not to be used by end users.

PathPlanner_PathFinder_DefaultNodeInfo



Internal function. Not to be used by end users.

PathPlanner_PathFinder_DoMinorALT



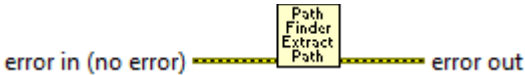
Internal function. Not to be used by end users.

PathPlanner_PathFinder_DoResetALT



Internal function. Not to be used by end users.

PathPlanner_PathFinder_ExtractPath



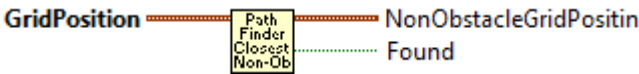
Internal function. Not to be used by end users.

PathPlanner_PathFinder_ExtractPathSub1ALT



Internal function. Not to be used by end users.

PathPlanner_PathFinder_FindClosestNonObstacle



Internal function. Not to be used by end users.

PathPlanner_PathFinder_GetAllNeighbors



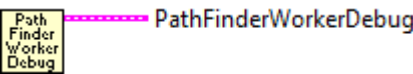
Internal function. Not to be used by end users.

PathPlanner_PathFinder_GetGridPos



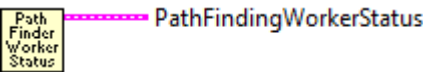
Internal function. Not to be used by end users.

PathPlanner_PathFinder_GetWorkerDebug



Get debug information for Path Finder worker

PathPlanner_PathFinder_GetWorkerStatus



Get status of Path Finder worker

PathPlanner_PathFinder_Globals



Globals for Path Finder

PathPlanner_PathFinder_GridPosToTranslation2d



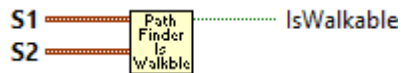
Internal function. Not to be used by end users.

PathPlanner_PathFinder_InitializeWorkerThread



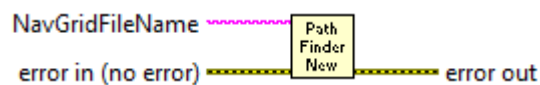
Internal function. Not to be used by end users.

PathPlanner_PathFinder_IsWalkable



Internal function. Not to be used by end users.

PathPlanner_PathFinder_New



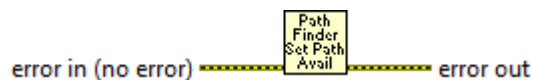
Create and initialize all data structures and back end VI (threads) needed by the Path Finder / Path Finding functions. Only one instance of this can be used at a time.

PathPlanner_PathFinder_SendCommand



Internal function. Not to be used by end users.

PathPlanner_PathFinder_SetNewPathAvail



Internal function. Not to be used by end users.

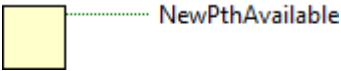
PathPlanner_PathFinder_WorkerThreadALT



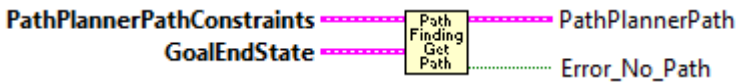
Background worker VI (thread) for the Path Finder / Path Finding functions. This will be started by the New function. This should NOT be called by an end user.

PathFinding

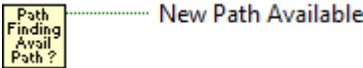
PathPlanner_PathFinding_GetCurrentPath



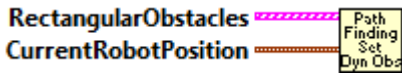
PathPlanner_PathFinding_GetNewPath



PathPlanner_PathFinding_IsNewPathAvailable



PathPlanner_PathFinding_SetDynamicObstacles

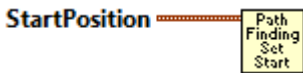


This has not been implemented yet. It can be called but it doesn't affect the created path.

PathPlanner_PathFinding_SetGoalPosition

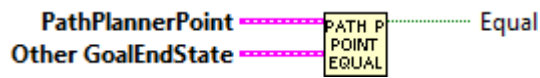


PathPlanner_PathFinding_SetStartingPosition



PathPoint

PathPlanner_PathPoint_Equals



Determines if two Path Point definitions are equal

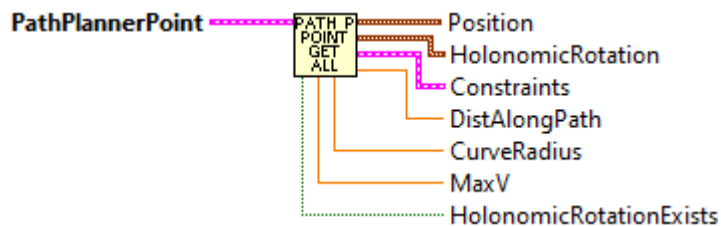
Inputs:

- PathPoint - cluster - point definition
- Other PathPoint - cluster - point definition

Outputs:

- Equal - boolean - TRUE if both definitions are the same.

PathPlanner_PathPoint_GetAll



Gets elements of PathPoint

Inputs:

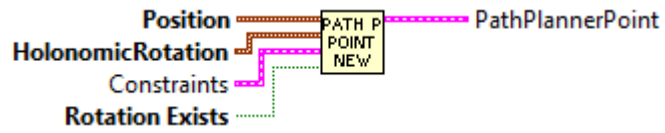
- PathPoint - cluster - point definition

Outputs:

- Position - Translation2d - position of point
- HolonomicRotation - Rotation2d - rotational orientation of point
- Constraints - cluster - constraints at this point
- DistAlongPath - double -
- CurveRadius - double -

-- MaxV - double

PathPlanner_PathPoint_New



Create a path point

Inputs:

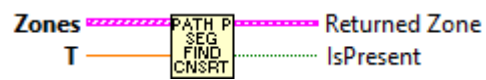
- position Position of the point
- holonomicRotation Rotation target at this point
- constraints The constraints at this point

Outputs:

- PathPlannerPoint - cluster - point definition

PathSegment

PathPlanner_PathSegment_FindConstraintZone



Find a constraints zone within this path segment.

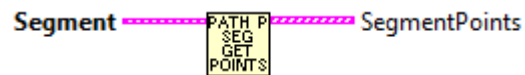
Inputs:

- PathSegment - cluster - Data defining path segment
- Zones - array - List of constraint zones to search.

Outputs:

- ReturnedZone - cluster - Found constraints zone definition.
- IsPresent - boolean - TRUE if a constraints zone was found.

PathPlanner_PathSegment_GetSegmentPoints



Get the path points for this segment

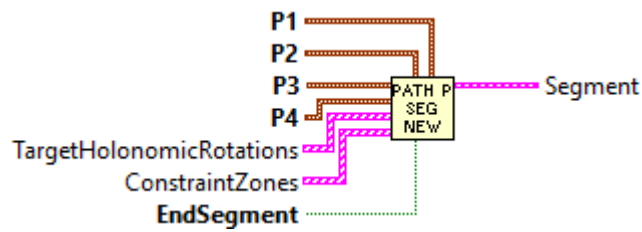
Inputs:

- PathSegment - cluster - Data defining path segment

Outputs:

- SetmentPoint - array - points for this segment
-

PathPlanner_PathSegment_New



Generate a new path segment

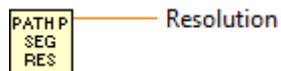
Inputs:

- p1 - translation2d - Start anchor point
- p2 - translation2d - Start next control
- p3 - translation2d - End prev control
- p4 - translation2d - End anchor point
- targetHolonomicRotations - array Rotation targets for within this segment (Optional. Default: empty)
- constraintZones - array - Constraint zones for within this segment (Optional. Default: empty)
- endSegment - boolean - Is this the last segment in the path

Outputs:

- Segment - cluster - Data defining path segment

PathPlanner_PathSegment_Resolution



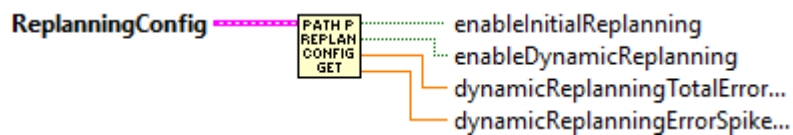
The resolution used during path generation

Outputs:

- Resolution - double

ReplanningConfig

PathPlanner_ReplanningConfig_GetAll



Get individual data elements from a PathPlanningConfig cluster

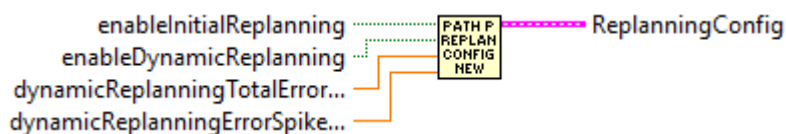
Inputs:

- PathPlanningConfig - cluster

Outputs:

- EnableInitialReplanning - boolean Should the path be replanned at the start of path following if the robot is not already at the starting point?
- EnableDynamicReplanning boolean - Should the path be replanned if the error grows too large or if a large error spike happens while following the path?
- DynamicReplanningTotalErrorThreshold - double - The total error threshold, in meters, that will cause the path to be replanned
- DynamicReplanningErrorSpikeThreshold - double - The error spike threshold, in meters, that will cause the path to be replanned

PathPlanner_ReplanningConfig_New



Create a path replanning configuration

Inputs:

- EnableInitialReplanning - boolean Should the path be replanned at the start of path following if the robot is not already at the starting point? (Optional. Default: TRUE)
- EnableDynamicReplanning boolean - Should the path be replanned if the error grows too large or if a large error spike happens while following the path? (Optional. Default: FALSE)

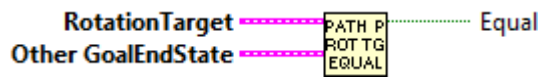
- `DynamicReplanningTotalErrorThreshold` - double - The total error threshold, in meters, that will cause the path to be replanned (Optional. Default: 1.0)
- `DynamicReplanningErrorSpikeThreshold` - double - The error spike threshold, in meters, that will cause the path to be replanned. (Optional. Default: 0.25)

Outputs:

- `ReplanningConfig` - cluster - created data cluster

RotationTarget

PathPlanner_RotationTarget_Equals



Determine if two rotation targets are equal

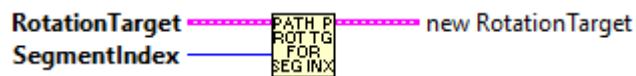
Inputs:

- RotationTarget - cluster - defined rotation target data structure
- OtherRotationTarget - cluster - defined rotation target data structure

Outputs:

- Equal - boolean - TRUE if both rotation targets are the same

PathPlanner_RotationTarget_ForSegmentIndex



Transform the position of this target for a given segment number.

For example, a target with position 1.5 for the segment 1 will have the position 0.5

Inputs:

- RotationTarget - cluster - defined rotation target data structure
- segmentIndex- integer - The segment index to transform position for

Outputs:

- NewRotationTarget - cluster - The transformed target
-

PathPlanner_RotationTarget_FromJSON



Create a rotation target from json

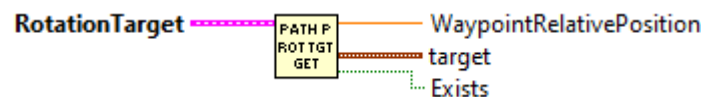
Inputs:

- JSON String - string - string potentially containing one or more of rotation target

Outputs:

- RotationTarget - array - Set of rotation targets defined by the given json string
- Exists - boolean - TRUE if any rotation targets were found in the JSON string.

PathPlanner_RotationTarget_GetAll



Get data elements of a rotation target.

Inputs:

- RotationTarget - cluster - defined rotation target data structure

Outputs:

- WaypointRelativePos - double - waypoint relative position of this target
- TargetRotation - rotation2d - Rotation value
- Exists - boolean - TRUE if rotation target is not null

PathPlanner_RotationTarget_New



Create a new rotation target

Inputs:

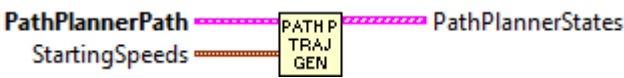
- waypointRelativePosition - double - Waypoint relative position of this target
- target - rotation2d - Target rotation

Outputs:

- RotationTarget - cluster - defined rotation target data structure

Trajectory

PathPlanner_Trajectory_GenerateStates



Internal routine to help create a trajectory from a path.

PathPlanner_Trajectory_GenerateStates_Pass1



Internal routine to help create a trajectory from a path.

PathPlanner_Trajectory_GenerateStates_Pass2



Internal routine to help create a trajectory from a path.

PathPlanner_Trajectory_GenerateStates_Pass3



Internal routine to help create a trajectory from a path.

PathPlanner_Trajectory_GetEndState



Get the end state of the trajectory

Inputs:

- Trajectory - cluster - trajectory definition

Outputs:

- EndState - trajectoryState - The end state

PathPlanner_Trajectory_GetInitialDifferentialPose



Get this initial pose for a differential drivetrain

Inputs:

- Trajectory - cluster - trajectory definition

Outputs:

- DifferentialPose - pose2d - The initial pose

PathPlanner_Trajectory_GetInitialState



Get the initial state of the trajectory

Inputs:

- Trajectory - cluster - trajectory definition

Outputs:

- InitialState - trajectoryState - The initial state

PathPlanner_Trajectory_GetInitialTargetHolonomicPose



Get the initial target pose for a holonomic drivetrain NOTE: This is a "target" pose, meaning the rotation will be the value of the next rotation target along the path, not what the rotation should be at the start of the path

Inputs:

- Trajectory - cluster - trajectory definition

Outputs:

- TargetHolonomicPose - pose2d - The initial target pose

PathPlanner_Path_GetNextRotationTargetIdx



Inputs:

- path - cluster - path definition

Outputs:

- NextRotationTargetIndex - integer -
- Found - boolean - rotation was found

PathPlanner_Trajectory_GetState



Get the goal state at the given index

In most (all) cases, using `sample()` is a better method.

Inputs:

- Trajectory -- PathPlanner Trajectory data cluster
- index -- The index of the state to retrieve

Outputs:

- TrajectoryState -- The state at the given index

PathPlanner_Trajectory_GetStates



Get all of the pre-generated states in the trajectory

Inputs:

- Trajectory - cluster - trajectory definition

Outputs:

- TrajectoryStates - array - List of all states

PathPlanner_Trajectory_GetTotalTime



Get the total run time of the trajectory

Inputs:

- Trajectory - cluster - trajectory definition

Outputs:

- TotalTime - seconds - Total run time in seconds

PathPlanner_Trajectory_GetWPITrajectory



Convert a PathPlanner trajectory into a LabVIEW / WPILib Trajectory.

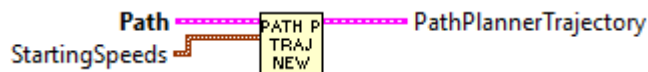
Inputs:

- PathPlannerTrajectory -- PathPlanner Trajectory data cluster

Outputs

- Trajectory -- LabVIEW trajectory library (WPlib style) trajectory data cluster.

PathPlanner_Trajectory_New



Generate a PathPlannerTrajectory

Inputs:

- path - cluster - path to generate the trajectory for
- startingSpeeds - chassis speeds - Starting speeds of the robot when starting the trajectory

Outputs:

- trajectory - cluster - created trajectory data

PathPlanner_Trajectory_New_States



Generate a PathPlannerTrajectory

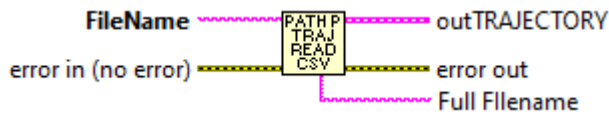
Inputs:

- PathPlannerStates - array of TrajectoryStates - States to use to create this trajectory/

Outputs:

- trajectory - cluster - created trajectory data

PathPlanner_Trajectory_ReadCSVFile



Create a trajectory from a CSV file. This can be used on a PC or the RoboRIO. Normally the CSV file is created as output from one of the trajectory utility programs. The file could also be created manually or by a custom written program.

Parameters:

- FileName -- Name of the CSV file to read. See file name notes for additional information.
- Error In -- Input error cluster (optional)

Returns:

- outTrajectory - Trajectory data structure cluster
- Error out - returned error cluster

Notes on use:

- This routine writes informational messages to the console and to the driver station log.

Notes on file naming:

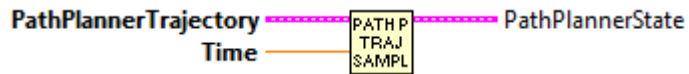
- The file name must include the extension. ".csv" is not automatically appended to the name.
- The file name can be a simple file or an absolute path. If a simple file name is used the default path on the RoboRIO is: "home:\lvuser\natinst\LabVIEW Data". On a Windows PC the default path is the LabVIEW default directory. Normally this is: %HOMEDRIVE%%HOMEPATH%\Documents\LabView Data".
- Filenames on the RoboRIO, which runs Linux, are case sensitive.

Notes on file contents:

- Blank lines are ignored.
- Lines that begin with either #, !, or ' in the first character are considered comments and are ignored.

-- Other lines are interpreted as comma separated data

PathPlanner_Trajectory_Sample



Get the target state at the given point in time along the trajectory

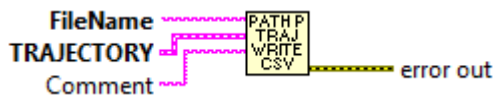
Inputs:

- PathPlannerTrajectory -- trajectory - PathPlanner Trajectory data cluster
- time -- double - The time to sample

Outputs:

- PathPlannerState - trajectorystate - The state at the given point in time

PathPlanner_Trajectory_WriteCSVFile



Create a CSV file from a trajectory. This can be used on a PC or the RoboRIO.

Parameters:

- FileName -- Name of the CSV file to read. See file name notes for additional information.
- Trajectory - Trajectory data structure cluster
- Comment - string - Optional comment to place in CSV file.

Returns:

- Error out - returned error cluster

Notes on file naming:

- The file name must include the extension. ".csv" is not automatically appended to the name.

-- The file name can be a simple file or an absolute path. If a simple file name is used the default path on the RoboRIO is: "home:\lvuser\natinst\LabVIEW Data". On a Windows PC the default path is the LabVIEW default directory. Normally this is: %HOMEDRIVE%%HOMEPATH%\Documents\LabView Data".

-- Filenames on the RoboRIO, which runs Linux, are case sensitive.

Notes on file contents:

-- Blank lines are ignored.

-- Lines that begin with either #, !, or ' in the first character are considered comments and are ignored.

-- Other lines are interpreted as comma separated data

PathPlanner_Trajectory_WriteCSVFileIndividualState



Internal subVI used by Util_Trajectory_WriteFile (and others). This writes one trajectory state to a file.

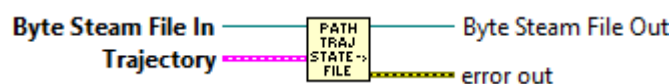
Parameters:

- Byte stream in - file stream
- comment - comment for this line
- TrajectoryState - The state to write

Returns:

- Byte Stream Out - file stream

PathPlanner_Trajectory_WriteCSVFileStates



Write trajectory states to a file. This is an internal routine

Parameters:

- ByteStreamIn - File stream

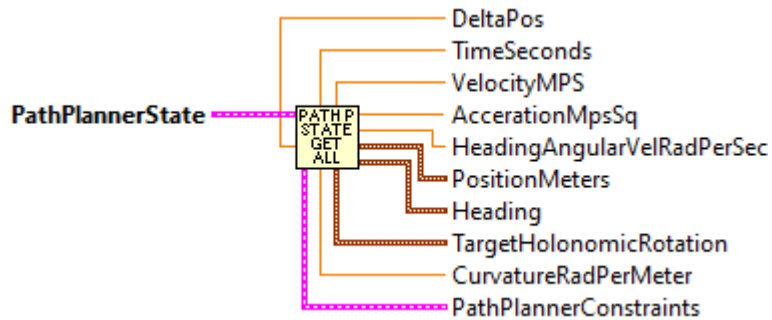
- Trajectory - Data structure containing trajectory

Returns:

- ByteArrayOutputStream - File stream
- Error out - returned error cluster

TrajectoryState

PathPlanner_TrajectoryState_GetAll



Gets elements of trajectory state

Inputs

- PathPlannerTrajectoryState -- cluster -- State data structure

Outputs:

- timeSeconds - double - The time at this state in seconds (default = 0;)
- velocityMps - double - The velocity at this state in m/s (default = 0)
- accelerationMpsSq - double - The acceleration at this state in m/s² (default = 0)
- headingAngularVelocityRps - double - The time at this state in seconds (default = 0)
- positionMeters - translation2d - The position at this state in meters (default = 0,0)
- heading - rotation2d - The heading (direction of travel) at this state (default = 0)
- targetHolonomicRotation - rotation2d - The target holonomic rotation at this state (default = 0)
- curvatureRadPerMeter - double - The curvature at this state in rad/m (default = 0)
- constraints -- cluster -- constraints to apply at this state (default - none)

PathPlanner_TrajectoryState_GetDifferentialPose



Get this pose for a differential drivetrain

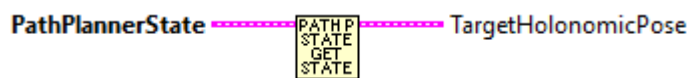
Inputs:

- trajectoryState - cluster - this trajectory state

Outputs:

- DifferentialPose - pose2d - The pose

PathPlanner_TrajectoryState_GetTargetHolonomicPose



Get the target pose for a holonomic drivetrain NOTE: This is a "target" pose, meaning the rotation will be the value of the next rotation target along the path, not what the rotation should be at the start of the path

Inputs:

- trajectoryState - cluster - this trajectory state

Outputs:

- TargetHolonomicPose - pose2d - the target pose

PathPlanner_TrajectoryState_GetWPITrajectoryState



Get Trajectory Library / WPILIB trajectory state from a PathPlanner Trajectory State

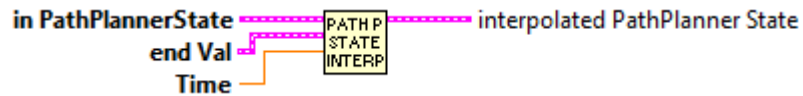
Inputs:

- PathPlannerState -- Path Planner trajectory state

Outputs:

- TrajectoryState -- LabVIEW trajectory library / WPILib trajectory state.

PathPlanner_TrajectoryState_Interpolate



Interpolate between this state and the given state

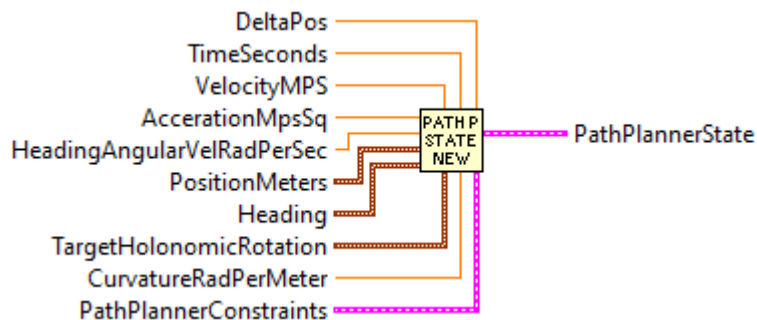
Inputs:

- trajectoryState - cluster - this trajectory state
- endVal - cluster - State to interpolate with
- t - double - Interpolation factor (0.0-1.0)

Outputs:

- Interpolated state - trajectory state - interpolated state

PathPlanner_TrajectoryState_New



Create a trajectory state

Inputs:

- timeSeconds - double - The time at this state in seconds (default = 0;)
- velocityMps - double - The velocity at this state in m/s (default = 0)
- accelerationMpsSq - double - The acceleration at this state in m/s² (default = 0)
- headingAngularVelocityRps - double - The time at this state in seconds (default = 0)
- positionMeters - translation2d - The position at this state in meters (default = 0,0)

- heading - rotation2d - The heading (direction of travel) at this state (default = 0)
- targetHolonomicRotation - rotation2d - The target holonomic rotation at this state (default = 0)
- curvatureRadPerMeter - double - The curvature at this state in rad/m (default = 0)
- constraints -- cluster -- constraints to apply at this state (default - none)

Outputs

- PathPlannerTrajectoryState -- cluster -- Newly created state

PathPlanner_TrajectoryState_Reverse

PathPlannerState  **Reversed State**

Get the state reversed, used for following a trajectory reversed with a differential drivetrain

Inputs:

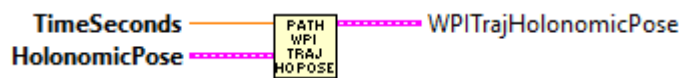
- trajectoryState - cluster - this trajectory state

Outputs:

- ReversedState- trajectorystate - The reversed state

WPITrajHolPose

PathPlanner_WPITrajHolPose_New



Create a WPITrajHolPose data cluster.

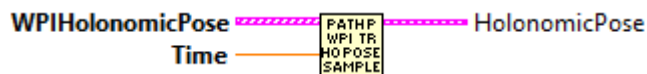
Inputs:

- TimeSeconds - double - Trajectory sample time
- HolonomicPose - pose2d - The holonomic Pose at this time.

Outputs:

- WPITrajHolonomicPose - cluster - created data structure

PathPlanner_WPITrajHolPose_Sample



Sample the WPI Trajectory Holonomic Pose array at a point in time

Inputs:

- WPIHolonomicPose - array - WPI Holonomic Pose data cluster
- time -- The time to sample

Outputs:

- HolonomicPose - pose2d - Desired holonomic pose at the given time.

Type Definitions

TypeDef

TypeDef-PathPlannerCmdFollowHolConfig



Configuration parameters for Path Planner Holonomic Controller.

Contains:

- Holonomic_Ctrl_Pack_Tuning - cluster
- Drive Base Radius M - double
- Max Wheel Speed M/S - double
- Tolerance SI - pose2d

HOLONOMIC_CTRL_PACK_TUNING

X PID Tuning

Kp

0

Ki

0

Kd

0

MaximumIntegral

9.9E+30

MinimumIntegral

-9.9E+30

Y PID Tuning

Kp

0

Ki

0

Kd

0

MaximumIntegral

9.9E+30

MinimumIntegral

-9.9E+30

thetaProfiledPID_CTRL

Controller

Kp

0.00000E+0

Ki

0.00000E+0

Kd

0.00000E+0

Period

0.00000E+0

Max_Integral

1.00000E+0

Min_Integral

-1.00000E+0

Max_Input

0.00000E+0

Min_Input

0.00000E+0

Measurement

0.00000E+0

Kf

0.00000E+0

DerivativeFilter



Min_Output

-9.99000E+35

Prev_F_P

0.00000E+0

AntiWindupActive



Continuous



PositionError

0.00000E+0

VelocityError

0.00000E+0

PrevError

0.00000E+0

TotalError

0.00000E+0

PositionTolerance

5.00000E-2

VelocityTolerance

9.99000E+35

SetPoint

0.00000E+0

Prev_Deriv

0.00000E+0

Prev_Deriv 2

0.00000E+0

Max_Output

9.90000E+35

Prev_F_P_2

0.00000E+0

Goal

Position

0.00000E+0

Velocity

0.00000E+0

Setpoint

Position

0.00000E+0

Velocity

0.00000E+0

Constraint

MaxVelocity

0.00000E+0

MaxAcceleration

0.00000E+0

TypeDef-PathPlannerCmdFollowLTVUnicycleConfig

Configuration parameters for Path Planner Holonomic Controller.

Contains:

- Holonomic_Ctrl_Pack_Tuning - cluster
- Drive Base Radius M - double
- Max Wheel Speed M/S - double
- Tolerance SI - pose2d

PathPlanner_Cmd_FollowLTVUnicycleConfig

LTV_Unicycle_Ctrl_Model	ReplanningConfig
Max X Pos Meas Tol M 0.0625	enableInitialReplanning <input checked="" type="checkbox"/>
Max Y Pos Meas Tol M 0.125	enableDynamicReplanning <input type="checkbox"/>
Max Heading Meas Tol Rad 0.2	dynamicReplanningTotalErrorThreshold 1
Max linear ctrl effort M/S 1	dynamicReplanningErrorSpikeThreshold 0.25
Max angular ctrl effort Rad/S 2	Trigger Events <input checked="" type="checkbox"/>
Max Linear Vel M/S 9	ControlPastEnd_Sec 3
Track Width Meters 1	Period 0.02
Max Speed M/S 4	
X Tolerance M 0.0762	
Y Tolerance M 0.0762	
Rotation Tolerance DEG 0.0872665	

TypeDef-PathPlannerCmdFollowRamConfig



Configuration parameters for Path Planner Holonomic Controller.

Contains:

- Holonomic_Ctrl_Pack_Tuning - cluster
- Drive Base Radius M - double
- Max Wheel Speed M/S - double
- Tolerance SI - pose2d

PathPlanner_Cmd_FollowRamConfig

RAMSETE_EXE_TUNING SI	ReplanningConfig
Track Width M <input type="text" value="2.0000"/>	enableInitialReplanning <input checked="" type="checkbox"/>
Max Speed M/S <input type="text" value="2.0000"/>	enableDynamicReplanning <input type="checkbox"/>
B <input type="text" value="2.0000"/>	dynamicReplanningTotalErrorThreshold <input type="text" value="1"/>
Zeta <input type="text" value="0.7000"/>	dynamicReplanningErrorSpikeThreshold <input type="text" value="0.25"/>
X Tolerance M <input type="text" value="2.0000"/>	
Y Tolerance M <input type="text" value="0.7000"/>	
Heading Tolerance RAD <input type="text" value="0.7000"/>	
ControlPastEnd_Sec <input type="text" value="3"/>	Trigger Events <input checked="" type="checkbox"/>

TypeDef-PathPlannerCommandUtil



The CommandUtil cluster stores the data for commands issued by Event Markers.

The cluster contains:

- name - string
- type - CommandUtilType_Enum
- WaitTime - double
- PathName - string
- Commands - array of cluster containing
 - Type - CommandUtilType_Enum
 - WaitTime - double
 - Name - string
 - PathName - string

CommandUtil

name

type
Unknown

waitTime

pathName

commands

type
Unknown

waitTime

name

pathName

TypeDef-PathPlannerConstraintsZone



A zone on a path with different kinematic constraints

Contains:

- MinWaypointPos - double - Starting distance on path to apply constraint
- MaxWaypointPos - double - Ending distance on path to apply constraint
- Constraint - cluster - Constraint to apply
- Present - boolean - flag indicting this cluster is not null

ConstraintsZone

minWaypointPos: 0

maxWaypointPos: 0 Present ☒

Constraints

MaxVelocityMps;: 0

MaxAccelerationMpsSq;: 0

MaxAngularVelRadPsEc;: 0

MaxAngularAccRadPSecSq: 0

Exists ☒

TypeDef-PathPlannerCtrlHolConfig



Configuration parameters for Path Planner Holonomic Controller.

Contains:

- Holonomic_Ctrl_Pack_Tuning - cluster
- Drive Base Radius M - double
- Max Wheel Speed M/S - double
- Tolerance SI - pose2d

HOLONOMIC_CTRL_PACK_TUNING

X PID Tuning

Kp

0

Ki

0

Kd

0

MaximumIntegral

9.9E+30

MinimumIntegral

-9.9E+30

Y PID Tuning

Kp

0

Ki

0

Kd

0

MaximumIntegral

9.9E+30

MinimumIntegral

-9.9E+30

thetaProfiledPID_CTRL

Controller

Kp

0.00000E+0

Ki

0.00000E+0

Kd

0.00000E+0

Period

0.00000E+0

Max_Integral

1.00000E+0

Min_Integral

-1.00000E+0

Max_Input

0.00000E+0

Min_Input

0.00000E+0

Measurement

0.00000E+0

Kf

0.00000E+0

DerivativeFilter



Min_Output

-9.99000E+35

Prev_F_P

0.00000E+0

AntiWindupActive



Continuous



PositionError

0.00000E+0

VelocityError

0.00000E+0

PrevError

0.00000E+0

TotalError

0.00000E+0

PositionTolerance

5.00000E-2

VelocityTolerance

9.99000E+35

SetPoint

0.00000E+0

Prev_Deriv

0.00000E+0

Prev_Deriv 2

0.00000E+0

Max_Output

9.90000E+35

Prev_F_P_2

0.00000E+0

Goal

Position

0.00000E+0

Velocity

0.00000E+0

Setpoint

Position

0.00000E+0

Velocity

0.00000E+0

Constraint

MaxVelocity

0.00000E+0

MaxAcceleration

0.00000E+0

TypeDef-PathPlannerCtrlLTVUnicycleConfig



Configuration parameters for Path Planner Differential Drive LTV Unicycle Controller.

Contains:

- LTV_Unicycle_Ctrl_Model - cluster
- LTV_Unicycle_Ctrl_Tolerance - cluster
- Track Width M - double
- Max Wheel Speed M/S - double

PathPlanner_Ctrl_LTVUnicycle_Config

LTV_Unicycle_Ctrl_Model	Track Width M
Max X Pos Meas Tol M <input type="text" value="0.0625"/>	<input type="text" value="0"/>
Max Y Pos Meas Tol M <input type="text" value="0.125"/>	Max Wheel Speed M/S
Max Heading Meas Tol Rad <input type="text" value="0.2"/>	<input type="text" value="0"/>
Max linear ctrl effort M/S <input type="text" value="1"/>	
Max angular ctrl effort Rad/S <input type="text" value="2"/>	
Max Linear Vel M/S <input type="text" value="9"/>	
LTV_Unicycle_Ctrl_Tolerance	
Max X Tolerance M <input type="text" value="2"/>	
Max Y Tolerance M <input type="text" value="0.2"/>	
Max Heading Tolerance Rad <input type="text" value="1"/>	

TypeDef-PathPlannerEventMarker

PATH P
EVENT
MARK

Position along the path that will trigger a command when reached

Contains

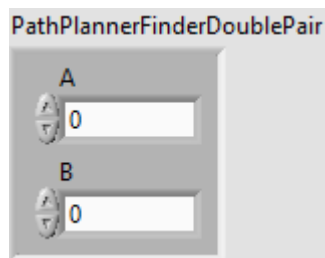
- WayPointRelativePose - double
- Command - cluster
- MinimumTriggerDistance - double
- MarkerPos - translation2d
- LastRobotPos - translation2d

EventMarker

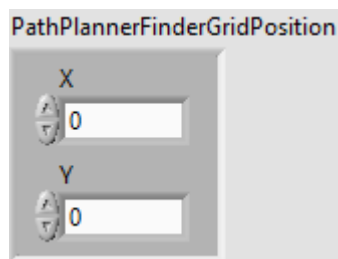
<p>WaypointRelativePos</p> <p>0</p> <p>minimumTriggerDistance</p> <p>0</p> <p>markerPos</p> <p>X</p> <p>0.000</p> <p>Y</p> <p>0.000</p> <p>lastRobotPos</p> <p>X</p> <p>0.000</p> <p>Y</p> <p>0.000</p> <p>markerPos Exists</p> <p>LastRobotPoseExists</p> <p>Triggered</p>	<p>Command</p> <p>name</p> <p>type</p> <p>Unknown</p> <p>waitTime</p> <p>0</p> <p>pathName</p> <p>commands</p> <p>0</p> <p>type</p> <p>Unknown</p> <p>waitTime</p> <p>0</p> <p>name</p> <p>pathName</p>
---	---

TypeDef-PathPlannerFinderDoublePair

PATH P
PAIR
DBL



TypeDef-PathPlannerFinderGridPosition



TypeDef-PathPlannerGoalEndState



Describes the goal end state of the robot when finishing a path

contains:

- velocity - double
- rotation - Rotation2d

GoalEndState

Velocity

0

Rotation

VALUE

0.0000

COS

1.0000

SIN

0.0000

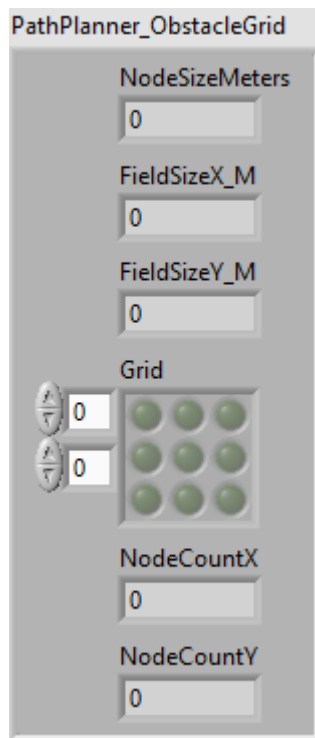
TypeDef-PathPlannerObstacleGrid



Contains definition of Obstacle grid. This grid is used to define areas pathfinding should avoid.

Contains:

- NodeSizeMeters - double - Size of each grid element. Meters
- Field size - translation2d - X and Y size of grid. Meters
- Grid - boolean array - Array containing obstacles to avoid when finding a path. Index into array is X, Y, where X and Y are increments of the node size in meters. If node size is 0.2 then array element (1,2) = position 0.2, 0.4 meters.



TypeDef-PathPlannerPath



A PathPlanner path. NOTE: This is not a trajectory and isn't directly followed.

Contains:

- bezierPoints - Translation2d array
- rotationTargets - RotationTarget array
- constraintZones - ConstraintsZone array
- eventMarkers - EventMarker array
- globalConstraints - PathConstraints
- goalEndState - GoalEndState
- allPoints - PathPoint array
- reversed - boolean
- previewStartingRotation - Rotation2d

BezierPoints

0

X

0.000

Y

0.000

RotationTargets

0

WaypointRelativePosition

0

target

VALUE

0.0000

COS

1.0000

SIN

0.0000

Exists

ConstraintZones

0

minWaypointPos

0

maxWaypointPos

0

Present

Constraints

MaxVelocityMps;

0

MaxAccelerationMpsSq;

0

MaxAngularVelRadPsEc;

0

MaxAngularAccRadPsecSq

0

Exists



EventMarkers

0

WaypointRelativePos

0

minimumTriggerDistance

0

markerPos

X

0.000

Y

0.000

lastRobotPos

X

0.000

Y

0.000

markerPos Exists



LastRobotPoseExists



Triggered



Command

name

type

Unknown



waitTime

0

pathName

commands

0

type

Unknown



waitTime

0

name

pathName

GoalEndState

Velocity

0

Rotation

VALUE

0.0000

COS

1.0000

SIN

0.0000

Reversed



PreviewStartingRotation

VALUE

0.0000

COS

1.0000

SIN

0.0000

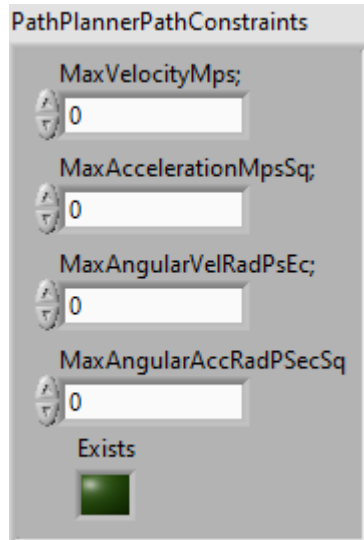
TypeDef-PathPlannerPathConstraints



Kinematic path following constraints

Contains:

- Max Velocity (Meters/Second)
- Max Acceleration (Meters/Second²)
- Max Angular Velocity (Radians/Second)
- Max Angular Acceleration (Radians/Second²)
- Exists - boolean - flag indicating this data is not NULL



TypeDef-PathPlannerPathPoint



A point along a pathplanner path

Contains:

- position - translation2d - The position of this point
- distanceAlongPath - double - The distance of this point along the path, in meters
- CurveRadius - double - The curve radius at this point

- MaxV - double - The max velocity at this point
- holonomicRotation - Rotation2d - The target rotation at this point
- constraints - cluster - The constraints applied to this point

PathPlannerPoint

Position	Constraints
X 0.000	MaxVelocityMps; 0
Y 0.000	MaxAccelerationMpsSq; 0
DistAlongPath 0	MaxAngularVelRadPsEc; 0
CurveRadius 0	MaxAngularAccRadPSecSq; 0
MaxV 9E+300	Exists <input checked="" type="checkbox"/>
HolonomicRotation VALUE 0.0000 COS 1.0000 SIN 0.0000	HolonomicRotationExists <input checked="" type="checkbox"/>

TypeDef-PathPlannerPathSegment



A bezier curve segment

Contains:

- SegmentPoints - array - Array of PathPoints

Segment

SegmentPoints

0

Position	Constraints
X 0.000	MaxVelocityMps; 0
Y 0.000	MaxAccelerationMpsSq; 0
DistAlongPath 0	MaxAngularVelRadPsEc; 0
CurveRadius 0	MaxAngularAccRadPSecSq; 0
MaxV 9E+300	Exists <input type="checkbox"/>
HolonomicRotation VALUE 0.0000 COS 1.0000 SIN 0.0000	HolonomicRotationExists <input type="checkbox"/>

TypeDef-PathPlannerRectangularObstacle

☐

RectanguarObstacle

CornerPos1	CornerPos2
X 0.000	X 0.000
Y 0.000	Y 0.000

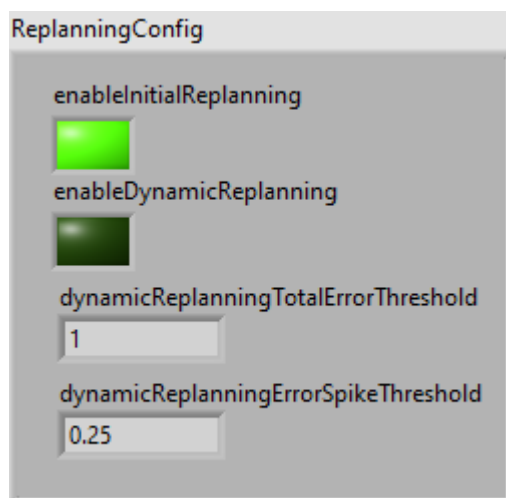
TypeDef-PathPlannerReplanningConfig



Configuration for path replanning

Contains:

- enableInitialReplanning - boolean - Should the path be replanned at the start of path following if the robot is not already at the starting point?
- enableDynamicReplanning - boolean - Should the path be replanned if the error grows too large or if a large error spike happens while following the path?
- dynamicReplanningTotalErrorThreshold - double - The total error threshold, in meters, that will cause the path to be replanned
- dynamicReplanningErrorSpikeThreshold - double - The error spike threshold, in meters, that will cause the path to be replanned



TypeDef-PathPlannerRotationTarget



A target holonomic rotation at a position along a path

Contains:

- waypointRelativePosition - double
- target - rotation2d
- exists - boolean - TRUE if not null

RotationTarget

WaypointRelativePosition

0

target

VALUE

0.0000

COS

1.0000

SIN

0.0000

Exists

☒

TypeDef-PathPlannerTrajectory

PATH P
TRAJ

Trajectory created from a pathplanner path

Contains:

- States - array - List of trajectory states

PathPlannerTrajectory

0

TimeSeconds	0	TargetHolonomicRotation	VALUE
VelocityMPS	0		0.0000
AccerationMpsSq	0	COS	1.0000
HeadingAngularVelRadPerSec	0	SIN	0.0000
PositionMeters		CurvatureRadPerMeter	0
X	0.000	DeltaPos	0
Y	1.000	PathPlannerConstraints	
Heading		MaxVelocityMps;	0
VALUE	0.0000	MaxAccelerationMpsSq;	0
COS	1.0000	MaxAngularVelRadPsEc;	0
SIN	0.0000	MaxAngularAccRadPSecSq	0
		Exists	<input checked="" type="checkbox"/>

TypeDef-PathPlannerTrajectoryState



A state along the trajectory

Contains:

- timeSeconds - double - The time at this state in seconds
- velocityMps - double - The velocity at this state in m/s
- accelerationMpsSq - double - The acceleration at this state in m/s^2
- headingAngularVelocityRPS - double - The time at this state in seconds

- positionMeters - translation2d - The position at this state in meters
- heading - rotation2d - The heading (direction of travel) at this state
- targetHolonomicRotation - rotation2d - The target holonomic rotation (orientation) at this state
- curvatureRadPerMeter - double - The curvature at this state in rad/m
- constraints - pathconstraints - The constraints to apply at this state
- deltaPos - double - Values only used during generation

PathPlannerState

<p>TimeSeconds</p> <input type="text" value="0"/>	<p>TargetHolonomicRotation</p> <p>VALUE</p> <input type="text" value="0.0000"/> <p>COS</p> <input type="text" value="1.0000"/> <p>SIN</p> <input type="text" value="0.0000"/>
<p>VelocityMPS</p> <input type="text" value="0"/>	<p>CurvatureRadPerMeter</p> <input type="text" value="0"/>
<p>AccerationMpsSq</p> <input type="text" value="0"/>	<p>DeltaPos</p> <input type="text" value="0"/>
<p>HeadingAngularVelRadPerSec</p> <input type="text" value="0"/>	<p>PathPlannerConstraints</p> <p>MaxVelocityMps;</p> <input type="text" value="0"/>
<p>PositionMeters</p> <p>X</p> <input type="text" value="0.000"/> <p>Y</p> <input type="text" value="0.000"/>	<p>MaxAccelerationMpsSq;</p> <input type="text" value="0"/>
<p>Heading</p> <p>VALUE</p> <input type="text" value="0.0000"/> <p>COS</p> <input type="text" value="1.0000"/> <p>SIN</p> <input type="text" value="0.0000"/>	<p>MaxAngularVelRadPsEc;</p> <input type="text" value="0"/>
	<p>MaxAngularAccRadPSecSq</p> <input type="text" value="0"/>
	<p>Exists</p> <input checked="" type="checkbox"/>

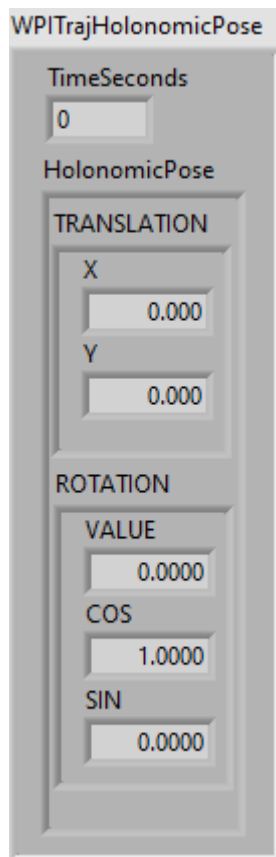
TypeDef-PathPlannerWPITrajHolonomicPose

WPI
TRAJ
HOL
POSE

The WPITrajHolonomicPose stores the Holonomic pose (position of robot and holonomic rotation) for a PathPlanner trajectory when its states are converted to WPI Trajectory states. This data structure can be sampled similar to other trajectory states. It allows the user to replace the normal WPI trajectory pose with this to help control holonomic robots.

Contains

- TimeSeconds - double
- HolonomicPose - pose2d



The image shows a GUI for the WPITrajHolonomicPose class. It has a title bar 'WPITrajHolonomicPose'. Below the title bar, there are three main sections: 'TimeSeconds' with a text box containing '0', 'HolonomicPose' which contains two sub-sections: 'TRANSLATION' and 'ROTATION'. The 'TRANSLATION' section has two text boxes: 'X' with '0.000' and 'Y' with '0.000'. The 'ROTATION' section has three text boxes: 'VALUE' with '0.0000', 'COS' with '1.0000', and 'SIN' with '0.0000'.

TypeDef- _Obsolete_PathPlannerWaypoint

PATH P
WAY-
POINT

PathPlannerWaypoint

AnchorPoint

X

Y

NextControl

X

Y

PrevControl

X

Y

HolonomicRotation

VALUE

COS

SIN

VelOverride

isReversal



Enumerated Type Definitions

Enum

Enum-PathPlanner_CommandUtilType_ENUM



Enumerated variable type for the type of command contained in the Command Util cluster. This is converted from a string contained in the path JSON.

The types are:

- Unknown
- Wait
- Named
- Path
- Sequential
- Parallel
- Race
- Deadline

A screenshot of a web form element. It has a label 'CommandUtil_Type' above a dropdown menu. The dropdown menu currently displays 'Unknown' and has a small downward arrow icon on the right side.

Enum-PathPlanner_PathFinding_Cmd_ENUM

A screenshot of a web form element. It has a label 'PathFindingCommand' above a dropdown menu. The dropdown menu currently displays 'Do Nothing' and has a small downward arrow icon on the right side.