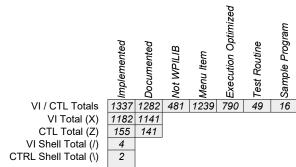
Revision 2025.0 1/7/2025 – Update april tag definitions, added new field.

This documents which Java/C++ WPILIB routines have been duplicated in LabVIEW, and which ones are not needed (for example because all that is needed is a cluster unpack function), and what isn't done....yet...



Doc completed Pct 95.89% Optimization Pct 59.09%

Optimize legend: S = Subroutine, I = Inline, X = reviewed, nothing done. (In some cases, after sufficient debug and use, additional optimizations could be considered.)

AUTONOMOUS

AUTO HELPER X X X X S AutoHelper_DelayedAction.vi

'======= BASE '=========

Category Implemented Documented Not WPILIB Menu Item Test Routine	Sample Program	Function Prototype	Notes	Code Review	Test Program	Error Checking
ANALOG DELAY X X X X I	AnalogDelay_Execute.vi		Similar to interpolated tree map			
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BumplessTransfer_Execute.vi				
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FUNCTION GENERATOR	X	X		X	1		FunctionGenerator_Add_Value.vi		Similar to interpolated tree map			
	Χ	X		Χ	1		FunctionGenerator_Add_XY.vi		Similar to interpolated tree map			
	X	X		Χ	I		FunctionGenerator_Calculate.vi		Similar to interpolated tree map			
	Χ	X		Χ	SI		FunctionGenerator_Clear.vi					
	Χ	Χ	Χ	Χ	1		FunctionGenerator_Execute.vi		Similar to interpolated tree map			
	X	X		Χ	SI		FunctionGenerator_New.vi		Similar to interpolated tree map			

FRC_LabVIEW_Trajectory_Library_Routines.xlsx

WPILib LabVIEW Math Library – VI Implementation List
Revision 2025.0 1/7/2025 – Update april tag definitions, added new field.

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Revision 2025.0 1/7/2025 – Update april tag definitions, added new field. TimeInterpPose2d Clear.vi X X X X SI X X X X SI TimeInterpPose2d_GetNewestSample.vi TimeInterpPose2d GetSample.vi $X \mid X \mid X \mid X \mid I$ TimeInterpPose2d GetTimeForValue.vi X X X X SI TimeInterpPose2d New.vi X X X X SI TimeInterpPose2d PopOldestSample.vi X X X X SI TimeInterpPose2d_SetMaxTime.vi Test Routine Menu Item Function Prototype VI Name Notes TIME INTERPOLATABLE ROTATION2D X X X X I TimeInterpRotation2d AddSample.vi Update to use create matrix TimeInterpRotation2d CleanUp.vi Update to use create matrix X X X X SI TimeInterpRotation2d Clear.vi TimeInterpRotation2d GetNewestSample.vi X X X X SI X X X X I TimeInterpRotation2d_GetSample.vi TimeInterpRotation2d GetTimeForValue.vi X X X X SI TimeInterpRotation2d_New.vi X X X X SI TimeInterpRotation2d PopOldestSample.vi TimeInterpRotation2d SetMaxTime.vi X X X X SI Not WPILIB Function Prototype Notes TIME INTERPOLATABLE VARIANT XXXXI TimeInterpVariant AddSample.vi Update to use create matrix TimeInterpVariant_CleanUp.vi Update to use create matrix X X X No X X X X SI TimeInterpVariant_Clear.vi X X X X SI TimeInterpVariant GetNewestSample.vi X X X X I TimeInterpVariant GetSample.vi TimeInterpVariant_GetTimeForValue.vi X X X X TimeInterpVariant Interpolate.vi This is a template for a user created routine. X X X X SI TimeInterpVariant New.vi X X X X SI X X X X SI TimeInterpVariant PopOldestSample.vi TimeInterpVariant SetMaxTime.vi VI Name Function Prototype Notes Time ElapsedTime.vi X X X X X X X I Time_WaitAdjust.vi Function Prototype Notes DIGITAL SEQUENTIAL LOGIC X X X X DigSeqLogic_Delay.vi | X | X | SI | X | X | SI | X | X | SI | DigSeqLogic_Edge_Change.vi DigSeqLogic_Edge_Off.vi DigSeqLogic_Edge_On.vi X X X X DigSeqLogic_On_Delay.vi DigSeqLogic_Off_Delay.vi $X \mid X \mid X \mid X \mid$ X X X X DigSeqLogic_One_Shot.vi X X X X SI DigSeqLogic_SR_Flip_Flop.vi

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Revision 2025.0 1/7/2025 – Update april tag definitions, added new field. Function Prototype DEBOUNCER X X X X X X X Debouncer New.vi Debouncer Calculate.vi X X X X Debouncer Execute.vi X X No Debouncer_Reset.vi Debouncer HasElapsed.vi No Function Prototype VI Name Notes DoubleSolenoid Pulse Execute.vi DOUBLE SOLENOID X Χ Function Prototype Notes DRUM SEQUENCE X DrumSequence_Cont_Execute.vi X X DrumSequence Pulse Execute.vi '======== COMMAND '======= Function Prototype Notes VI Name BOOLEAN COMMAND X
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WPILib LabVIEW Math Library – VI Implementation List Revision 2025.0 1/7/2025 – Update april tag definitions, added n

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ElevFF MinAchieveAccel.vi

WPILib LabVIEW Math Library - VI Implementation List Revision 2025.0 1/7/2025 – Update april tag definitions, added new field. ElevFF MinAchieveVelocity.vi X ElevFF_New_ZeroAccel.vi $X \mid X$ X XX ElevFF New.vi ltem VI Name Function Prototype Notes HolDrvCtrl AdvCalculate Trajectory.vi Added 1/24/2022 Added 1/24/2022 HolDrvCtrl AdvCalculate.vi XX X SI HolDrvCtrl AtReference.vi Added 1/26/21 HolDrvCtrl Calculate Trajectory.vi Added 1/26/21 $X \mid X$ X HolDrvCtrl Calculate.vi Added 1/26/21 XX Χ HolDrvCtrl Execute Trajectory.vi Added 1/24/2022 HolDrvCtrl Execute.vi Future X X X SI HolDrvCtrl New.vi Added 1/26/21 HolDrvCtrl_PackExecuteSP.vi X X X X SI HolDrvCtrl PackPID.vi Added 1/24/2022 X X X X HolDrvCtrl PackProfPID.vi X X X X Added 1/24/2022 XX X SI HolDrvCtrl SetEnabled.vi Added 1/26/21 X SI HolDrvCtrl SetTolerance.vi Added 1/26/21 Not WPILIB VI Name Function Prototype Notes PID AUTOTUNE X X X No PIDAutoTune ClosedLoopStep.vi PIDAutoTune_Convert_Academic_To_NonInteracting.vi X X X No x X X No PIDAutoTune_OpenLoopStep.vi X X X X PIDAutoTune SetTuningArguments.vi $X \mid X \mid X \mid X$ PIDAutoTune Step Execute.vi ζo VI Name Function Prototype Notes PID CONTROLLER X X X X PIDController AdvCalculate FF Sp Pv Per.vi Advanced PID PIDController_AdvCalculate_FF_Sp_Pv.vi Advanced PID X X X X PIDController AdvExecute.vi X X X X Labview style helper. Advanced X X X X X PIDController AtSetpoint.vi SI PIDController Calculate PV.vi XX X PIDController Calculate SP PV.vi XX X SI PIDController DisableContinousInput.vi PIDController_EnableContinousInput.vi X SI $X \mid X$ X X X X PIDController Execute.vi Labview style helper OBSOLETE - Removed PIDController GetContinuousError.vi XX X SI PIDController GetPeriod.vi XX X SI PIDController GetPID.vi X SI PIDController GetPositionError.vi XX X SI X SI X X X X PIDController GetSetpoint.vi PIDController_GetTolerance.vi XX X SI PIDController_GetVelocityError.vi XX X SI PIDController IsContinuousInputEnabled.vi PIDController New.vi $X \mid X \mid$ X I X X X X I X X X X X SI X X X X X SI PIDController NewPeriod.vi PIDController Pack AdvLimits.vi PIDController_Pack_AdvTuning.vi

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PIDController Pack InputLimits.vi

PIDController Pack Tuning.vi

PIDController Reset.vi

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WPILib LabVIEW Math Library – VI Implementation List
Revision 2025.0 1/7/2025 – Update april tag definitions, added new field.

 Update april tag definitions, added 												
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	X	X .	X	X	SI		PIDController_SetDerivativeFilter.vi		Advanced PID			
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	Χ	Х		X S	SI		PIDController_SetI.vi		ODSOLETE Demoved			
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		X		Χ			ProfiledPIDController_Calculate_Meas_Goal.vi					
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									3			
	X			X S	SI		ProfiledPIDController_GetGoal.vi					
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FRC_LabVIEW_Trajectory_Library_Routines.xlsx Page 8 / 42 Revision 2025.0 1/7/2025 – Update april tag definitions, added new field. Menu Item Function Prototype Notes RAMSETE X X X SI Ramsete AtReference.vi AtReference calculate_trajectory XX XX Ramsete Calculate Trajectory.vi Ramsete Calculate.vi $X \mid X \mid$ XX calculate Ramsete_Execute_ENG.vi X X X X I Use this one!! X X X X I X X X X I Ramsete Execute Ext Odom.vi Ramsete_Execute_Ext_Odom_ENG.vi X X X X SI Ramsete Execute PackTuning ENG.vi Ramsete Execute PackTuning.vi X X X X SI X X X X I Ramsete_Execute.vi X SI X SI Ramsete New B Z.vi new(b, zeta) Ramsete New.vi XX X SI Ramsete SetEnabled.vi SetEnabled Ramsete SetTolerance.vi $X \mid X \mid$ X SI SetTolerance XX Ramsete SINC.vi $X \mid X \mid$ internal sinc Test Routine ltem Function Prototype Notes SimpleMotorFF_Calculate CalcAccel.vi SIMPLE MOTOR FEEDFORWARD X X X X SI SimpleMotorFF Calculate NextV Dt.vi XX Χ SimpleMotorFF Calculate.vi SI public double calculate(double velocity, double acceleration) SimpleMotorFF_CalculateVelocityOnly.vi $X \mid X$ X SI public double calculate(double velocity) SimpleMotorFF Ka AutoTune.vi $X \mid X \mid X \mid X$ SimpleMotorFF MaxAchieveAccel.vi public double maxAchievableAcceleration(double maxVoltage, Χ X double velocity) Χ SimpleMotorFF_MaxAchieveVel.vi $X \mid X$ public double maxAchievableVelocity(double maxVoltage, double acceleration) XX Χ SimpleMotorFF MinAchieveAccel.vi public double minAchievableAcceleration(double maxVoltage, double velocity) SimpleMotorFF MinAchieveVel.vi $X \mid X$ Χ public double minAchievableVelocity(double maxVoltage, double SimpleMotorFF_New.vi XX public SimpleMotorFeedforward(double ks, double kv, double ka) X SI X X X X SI SimpleMotorFF Pack Ka Tune Params.vi public SimpleMotorFeedforward(double ks, double kv) '======== GEOMETRY '======== Routine VI Name Function Prototype Notes COORDINATE AXIS X X X CoordAxis D.vi SI CoordAxis E.vi SI XX X SI CoordAxis N.vi $X \mid X$ X SI CoordAxis New.vi CoordAxis S.vi X SI $X \mid X$ SI CoordAxis U.vi X SI XX CoordAxis W.vi

FRC_LabVIEW_Trajectory_Library_Routines xlsx

WPILib LabVIEW Math Library – VI Implementation List
Revision 2025.0 1/7/2025 – Update april tag definitions, added new field.

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		· ·		X	SI			Pose2d New TRRO.vi	pose2d new(translation2d, rotation2d)				
	X			X	SI			Pose2d New.vi	pose2d new(double x, double y, rotation2d)				
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WPILib LabVIEW Math Library – VI Implementation List
Revision 2025.0 1/7/2025 – Update april tag definitions, added new field.

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	X	X		X	SI		+	Rotation2d GetTan.VI	double getTan()	can calculate			
	X	X		X	SI			Rotation2d_Interpolate.vi	acasic gerrany				
	X	Χ		X	SI			Rotation2d_Minus.vi	rotation2d minus(rotation2d other)				
	X			X				Rotation2d_Plus.vi	rotation2d plus(rotation2d other)				
	X	X		X	SI SI			Rotation2d_RotateBy.vi Rotation2d_Times.vi	rotation2d rotateby(rotation2d other) rotation2d times(double scalar)				
	X	$\frac{\lambda}{X}$		$\frac{\lambda}{X}$	SI			Rotation2d_Times.vi	rotation2d unaryminus()				
				- `					rotation2d new()	can use cluster constant			
	Implemented	Documented	Vot WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program				Code Review	Test Program	rror Checking
DOTATIONS	X						Ŋ	VI Name Rotation3d_Create_AxisAngle.vi	Function Prototype	Notes	Ŭ	7	En
ROTATION3D	X			X	SI		1	Rotation3d_Create_AxisAngle.vi					
	X	\hat{x}		X	SI			Rotation3d Create Quaternion.vi					
	Χ	X		X	1			Rotation3d_Create_InitialFinalVector.vi					
	X	X		X	SI			Rotation3d_Create_RollPitchYaw.vi					
	X			X			1	Rotation3d_Create_RotMatrix.vi					
	Χ			X			1	Rotation3d_Div.vi Rotation3d Equals.vi					
	V				1 01	- 1	1	INDIGUOLOU EUUGIO.VI					
	X	X	X	X	SI								
	X	X	X	X	SI			Rotation3d_GetAxisAngle.vi Rotation3d_GetQuaternion.vi					
	X	X X X	X	X X X	SI SI			Rotation3d_GetAxisAngle.vi					

finitions, added	X	X		X	SI	\top	Rotation3d Minus.vi					
	X	X		X	SI	+	Rotation3d Plus.vi					
	X	X		X	SI		Rotation3d RotateBy.vi					
	X	X			SI	+-	Rotation3d Times.vi					
	X	X		X	SI	+-	Rotation3d ToRotation2d.vi					
	X	X			SI	+-	Rotation3d UnaryMinus.vi					
					<u> </u>	+-	Treatment of the Treatm					
ANSFORM2D		X Documented	Not WPILIB		99 9 Execution Optimized Test Routine	Sample Program	VI Name Transform2d_Create_PosePose.vi	Function Prototype transform2d new(pose2d, pose2d)	Notes	Code Review	Test Program	Error Checking
	X	X		X	SI	+-	Transform2d_Create_TransRot.vi Transform2d_Div.vi	transform2d new(translation2d, rotation2d)				
	X	X		$\frac{\lambda}{X}$	SI	+-	Transform2d Equals.VI	boolean equals(other transform2d)				
				$\frac{\lambda}{X}$	SI	+	Transform2d GetRotation.VI		ugo aluator uppoak			
	X	X				+		rotation2d getRotation()	use cluster unpack			
	X	X			SI	+	Transform2d_GetTranslation.VI	translation2d getTranslation()	use cluster unpack			-
	X	X	X	X	SI SI	+-	Transform2d_GetXY.vi Transform2d_GetXYAngle.vi					-
	X	X	^	X	SI	+-	Transform2d_GetXYAngle.vi Transform2d_Inverse.vi	transform inverse()	new			
	X	X			Si	+-	Transform2d_Inverse.vi Transform2d_Plus.vi	uansioni iiveise()	new			
	X	X		X	SI	+-	Transform2d_Plus.vi	transform2d times(double scalar)				
	^	^		^	JI		ITATISTOTITIZU_TITITES.VI	transform2d times(double scalar) transform2d new()	can use cluster constant			\vdash
							4	transionizariew()	can use duster constant			
	X X X X	X X X X X		X X X	SI SI SI SI SI		Transform3d_Create_Pose3dPose.3dvi Transform3d_Create_Trans3dRot3d.vi Transform3d_Div.vi Transform3d_Equals.VI Transform3d_GetRotation3d.VI Transform3d_GetTranslation3d.VI					
	X	X				+						-
	X	X	Χ	X	SI SI	+	Transform3d_GetXYZ.vi Transform3d Inverse.vi					-
	X	X			Si	+-	Transform3d_Inverse.vi Transform3d_Plus.vi					-
				$\frac{x}{X}$		+	Transform3d_Plus.vi					
					pe.						5	cking
	olemented	cumented	t WPILIB	nu Item	ecution Optimiz st Routine	mple Program				de Review	st Progran	or Che
	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimiz Test Routine	mple	VI Name	Function Prototype	Notes	Code Review	Test Progran	Error Che
SLATION2D	X	X	Not WPILIB	X	SI	Sample Program	Translation2d_Create_DistAng.vi		Notes	Code Review	Test Progran	Error Che
SLATION2D	X	X	Not WPILIB	X	SI SI	Sample Program	Translation2d_Create_DistAng.vi Translation2d_Create.vi	Function Prototype translation2d new(double x, double y)	Notes	Code Review	Test Progran	Error Che
ISLATION2D	X X X	X X X	Not WPILIB	X X X	SI SI	Sample Program	Translation2d_Create_DistAng.vi Translation2d_Create.vi Translation2d_Div.vi	translation2d new(double x, double y)	Notes	Code Review	Test Progran	Error Che
ISLATION2D	X X X X	X X X	Not WPILIB	X X X	SI SI SI	Sample Program	Translation2d_Create_DistAng.vi Translation2d_Create.vi Translation2d_Div.vi Translation2d_Equals.vi		Notes	Code Review	Test Progran	Error Che
ISLATION2D	X X X X	X X X X	Not WPILIB	X X X X	SI SI SI SI	Sample Program	Translation2d_Create_DistAng.vi Translation2d_Create.vi Translation2d_Div.vi Translation2d_Equals.vi Translation2d_GetAngle.vi	translation2d new(double x, double y) boolean equals(translation other)	Notes	Code Review	Test Progran	Error Che
ISLATION2D	X X X X X X X	X X X X X	Not WPILIB	X X X X X	SI SI SI SI SI	Sample Program	Translation2d_Create_DistAng.vi Translation2d_Create.vi Translation2d_Div.vi Translation2d_Equals.vi Translation2d_GetAngle.vi Translation2d_GetDistance.vi	translation2d new(double x, double y) boolean equals(translation other) double getDistance(translation2d other)		Code Review	Test Progran	Error Che
ISLATION2D	X X X X X X X	X X X X X X	Not WPILIB	X X X X X X	SI SI SI SI SI SI	Sample Program	Translation2d_Create_DistAng.vi Translation2d_Create.vi Translation2d_Div.vi Translation2d_Equals.vi Translation2d_GetAngle.vi Translation2d_GetDistance.vi Translation2d_GetNorm.VI	translation2d new(double x, double y) boolean equals(translation other) double getDistance(translation2d other) double getNorm()	can use cluster unpack	Code Review	Test Progran	Error Che
NSLATION2D	X X X X X X X X	X X X X X X X		X X X X X X X	SI SI SI SI SI SI SI	Sample Program	Translation2d_Create_DistAng.vi Translation2d_Create.vi Translation2d_Div.vi Translation2d_Equals.vi Translation2d_GetAngle.vi Translation2d_GetDistance.vi Translation2d_GetNorm.VI Translation2d_GetX.VI	translation2d new(double x, double y) boolean equals(translation other) double getDistance(translation2d other)		Code Review	Test Progran	Error Che
NSLATION2D	X X X X X X X X X X X X X X X X X X X	X X X X X X X X	Not WPILIB	X X X X X X X X	SI SI SI SI SI SI SI SI	Sample Program	Translation2d_Create_DistAng.vi Translation2d_Create.vi Translation2d_Div.vi Translation2d_Equals.vi Translation2d_GetAngle.vi Translation2d_GetDistance.vi Translation2d_GetNorm.VI Translation2d_GetX.VI Translation2d_GetXY.VI	translation2d new(double x, double y) boolean equals(translation other) double getDistance(translation2d other) double getNorm() double getX()	can use cluster unpack can use cluster unpack	Code Review	Test Progran	Error Che
NSLATION2D	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X		X X X X X X X X X	SI SI SI SI SI SI SI SI	Sample Program	Translation2d_Create_DistAng.vi Translation2d_Create.vi Translation2d_Div.vi Translation2d_Equals.vi Translation2d_GetAngle.vi Translation2d_GetDistance.vi Translation2d_GetNorm.VI Translation2d_GetX.VI Translation2d_GetXY.VI Translation2d_GetY.VI Translation2d_GetY.VI	translation2d new(double x, double y) boolean equals(translation other) double getDistance(translation2d other) double getNorm()	can use cluster unpack	Code Review	Test Progran	Error Che
ISLATION2D	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X		X X X X X X X X X X X X	SI SI SI SI SI SI SI SI SI SI	Sample Program	Translation2d_Create_DistAng.vi Translation2d_Create.vi Translation2d_Div.vi Translation2d_Equals.vi Translation2d_GetAngle.vi Translation2d_GetDistance.vi Translation2d_GetNorm.VI Translation2d_GetX.VI Translation2d_GetXY.VI Translation2d_GetY.VI Translation2d_GetY.VI Translation2d_Interpolate.vi	translation2d new(double x, double y) boolean equals(translation other) double getDistance(translation2d other) double getNorm() double getX() double getY()	can use cluster unpack can use cluster unpack	Code Review	Test Progran	Error Che
NSLATION2D	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X		X X X X X X X X X X X X X X X X X X X	SI SI SI SI SI SI SI SI SI SI SI	Sample Program	Translation2d_Create_DistAng.vi Translation2d_Create.vi Translation2d_Div.vi Translation2d_Equals.vi Translation2d_GetAngle.vi Translation2d_GetDistance.vi Translation2d_GetNorm.VI Translation2d_GetX.VI Translation2d_GetXY.VI Translation2d_GetY.VI Translation2d_Interpolate.vi Translation2d_Interpolate.vi Translation2d_Minus.vi	translation2d new(double x, double y) boolean equals(translation other) double getDistance(translation2d other) double getNorm() double getX() double getY() translation2d minus(translation2d other)	can use cluster unpack can use cluster unpack	Code Review	Test Progran	Error Che
NSLATION2D	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X		X X X X X X X X X X X X X X X X X X X	SI SI SI SI SI SI SI SI SI SI SI SI	Sample Program	Translation2d_Create_DistAng.vi Translation2d_Create.vi Translation2d_Div.vi Translation2d_Equals.vi Translation2d_GetAngle.vi Translation2d_GetDistance.vi Translation2d_GetNorm.VI Translation2d_GetX.VI Translation2d_GetX.VI Translation2d_GetY.VI Translation2d_GetY.VI Translation2d_GetY.VI Translation2d_Interpolate.vi Translation2d_Minus.vi Translation2d_Plus.vi	translation2d new(double x, double y) boolean equals(translation other) double getDistance(translation2d other) double getNorm() double getX() double getY() translation2d minus(translation2d other) translation2d plus(translation2d other)	can use cluster unpack can use cluster unpack	Code Review	Test Program	Error Che
NSLATION2D	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X		X X X X X X X X X X X X X X X X X X X	SI SI SI SI SI SI SI SI SI SI SI SI	Sample Program	Translation2d_Create_DistAng.vi Translation2d_Create.vi Translation2d_Div.vi Translation2d_Equals.vi Translation2d_GetAngle.vi Translation2d_GetDistance.vi Translation2d_GetNorm.VI Translation2d_GetX.VI Translation2d_GetX.VI Translation2d_GetY.VI Translation2d_GetY.VI Translation2d_GetY.VI Translation2d_Interpolate.vi Translation2d_Interpolate.vi Translation2d_Plus.vi Translation2d_RotateBy.vi	translation2d new(double x, double y) boolean equals(translation other) double getDistance(translation2d other) double getNorm() double getX() double getY() translation2d minus(translation2d other) translation2d plus(translation2d other) translation2d rotateBy(rotation2d other)	can use cluster unpack can use cluster unpack	Code Review	Test Program	Error Che
NSLATION2D	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X		X X X X X X X X X X X X X X X X X X X	SI SI SI SI SI SI SI SI SI SI SI SI SI	Sample Program	Translation2d_Create_DistAng.vi Translation2d_Create.vi Translation2d_Div.vi Translation2d_Equals.vi Translation2d_GetAngle.vi Translation2d_GetDistance.vi Translation2d_GetNorm.VI Translation2d_GetX.VI Translation2d_GetX.VI Translation2d_GetY.VI Translation2d_GetY.VI Translation2d_GetY.VI Translation2d_Interpolate.vi Translation2d_Minus.vi Translation2d_Plus.vi	translation2d new(double x, double y) boolean equals(translation other) double getDistance(translation2d other) double getNorm() double getX() double getY() translation2d minus(translation2d other) translation2d plus(translation2d other)	can use cluster unpack can use cluster unpack	Code Review	Test Program	

'====== KINEMATICS '=======														
		Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	∕I Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
	CHASSIS SPEEDS	X	X		X	SI			ChassisSpeeds_FromFieldRelativeChassisSpeeds.VI					
		X	X		X	SI		C	ChassisSpeeds_FromFieldRelativeSpeeds.VI	chassisspeeds fromFieldRelativeSpeeds(double x, double y, double angvel, rotation2d robotangle)				
		Χ	X	Χ	X	SI		(ChassisSPeeds_GetXYOmega.vi	• /				
		Χ	X		X	SI			ChassisSpeeds_New.vi	chassisspeeds new (double xvel, double yvel, double angvel)				
										chassisspeeds new ()	can use cluster constant			

FRC_LabVIEW_Trajectory_Library_Routines.xlsx

Revision 2025.0 1/7/2025 – Update april tag definitions, added new field. Function Prototype Notes DIFFERENTIAL DRIVE KINEMATICS X X DiffKinematics New.vi diffDriveKine new(double trackWidth) chassisSpeeds toChassisSpeeds(diffDrWheelSpeeds) XX XX X DiffKinematics toChassisSpeed.vi XX DiffKinematics ToTwist2d.vi X SI XX X SI X DiffKinematics_toWheelSpeed.vi diffDriveWheelSpeed toWheelSpeeds(chassisSpeeds) Function Prototype Notes **DIFFERENTIAL DRIVE ODOMETRY** DiffOdometry Execute.vi DONT NEED DiffOdometry_Update.vi pose2d update(rotation2d gyro, double leftdist, double right dist) Incorporates enhanced reset diffDrOdom new(rotation gyro, pose initial) diffDrOdom new(rotation gyro)
void resetPosition(pose2d, rotation2d) incorporated into "update" pose2d getPoseMeters() Function Prototype DIFFERENTIAL DRIVE ODOMETRY 2 X DiffDrvOdom2 Execute.vi Replacement for orig diff drive DiffDrvOdom2 GetPose.vi X SI DiffDrvOdom2_New.vi X I XX DiffDrvOdom2 Reset.vi X SI DiffDrvOdom2 Update.vi Function Prototype VI Name Notes DIFFERENTIAL DRIVE WHEEL SPEEDS diffDrWheelSpeeds new() diffDrWheelSpeeds new(double leftVel, double rightVel) DiffWheel Normalize.vi void normalize(double maxVel) VI Name Function Prototype Notes MECANUM DRIVE KINEMATICS X X MecaKinematics New.vi MecaKinematics SetInverseKinematics.vi XX Χ MecaKinematics ToChassisSpeeds.vi MecaKinematics ToTwist2d.vi $X \mid X$ X MecaKinematics_ToWheelSpeeds.vi XX Χ MecaKinematics ToWheelSpeedsZeroCenter.vi

MECANUM DRIVE MOTOR VOLTAGE			NOT WPILIB	Menu Item	Execution Optimized	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
MECANUM DRIVE ODOMETRY	X X Implemented	X X Documented	X	Wenu Item	- 1 0 0 - Execution Optimized	Sample Program	VI Name MecaOdometry_Execute.vi MecaOdometry_GetKinematics.vi MecaOdometry_GetPose.vi MecaOdometry_New.vi	Function Prototype	Notes	Code Review	Test Program	Error Checking
	X	X X X)	X	SI I		MecaOdometry_NewDefaultPose.vi MecaOdometry_Reset.VI MecaOdometry_Update.vi					
					~		MecaOdometry_UpdateWithTime.vi		Removed			
MECANUM DRIVE WHEEL POSITION	X X	X X X Documented	Not W	X X	© © © Execution Optimized	Sample Program	VI Name MecaWheelPos_Get.vi MecaWheelPos_New.vi MecaWheelPos_Sub.vi	Function Prototype	Notes	Code Review	Test Program	Етог Checking
					70							
MECANUM DRIVE WHEEL SPEEDS		X Documented	Not W	X Menu item	© Execution Optimized	Sample Program	VI Name MecaWheel_New.Vi	Function Prototype public MecanumDriveWheelSpeeds(double frontLeftMetersPerSecond, double frontRightMetersPerSecond, double rearLeftMetersPerSecond, double rearRightMetersPerSecond)	Notes	Code Review	Test Program	Error Checking
		X Z	X 2		SI X		MecaWheel_GetAll.vi MecaWheel_Normalize.vi	public void normalize(double				
	r 0	D	m ,		Execution Optimized	Sample Program		attainableMaxSpeedMetersPerSecond)		de Review	st Program	or Checking
SWERVE DRIVE KINEMATICS					Ä Ř	Sai	VI Name SwerveKinematics New4.VI	Function Prototype	Notes For 4 module drives	Code	7e.	Em
SWERVE DRIVE RINEMATICS	X X X X X X	X	X	X X			SwerveKinematics_NewX.VI SwerveKinematics_NormalizeWheelSpeeds.vi SwerveKinematics_ToChassisSpeeds4.VI	public static void normalizeWheelSpeeds(SwerveModuleState[] moduleStates, double attainableMaxSpeedMetersPerSecond)	uses array as input For 4 module drives			
	XXX	X Z	X 2	X			SwerveKinematics_ToChassisSpeedsX.VI SwerveKinematics_ToSwerveModuleStates.VI	public SwerveModuleState[] toSwerveModuleStates(ChassisSpeeds chassisSpeeds, Translation2d centerOfRotationMeters) public SwerveModuleState[]	uses array as input			
		X		X			SwerveKinematics_ToSwerveModuleStatesZeroCenter.VI	public SwerveModuleState[] toSwerveModuleStates(ChassisSpeeds chassisSpeeds)				
	X	X)	X			SwerveKinematics_ToTwist2d4.VI					

PILib LabVIEW Math Library – VI Implementation Listion 2025.0 1/7/2025 – Update april tag definitions, adde	d new											
		X		X			SwerveKinematics_ToTwist2dX.VI	public SwerveDriveKinematics(Translation2d wheelsMeters)	variable parameters (replace with			
								public ChassisSpeeds toChassisSpeeds(SwerveModuleState	array and "4" calls) variable parameters (replace with			
								wheelStates)	array and "4" calls)			
					pəz							
	ented	Documented	Not WPILIB	em	on Optimiz	Routine note Program				eview	ogram	hecking
	lem	ŭ,	W	זו ער	Execution	t Ro				ð R	t Pr	Š
	du,	Doc	Not	Menu	Exe	Test	VI Name	Function Prototype	Notes	Cod	7esi	Enc
SWERVE DRIVE ODOMETRY							SwerveOdometry_Execute4.vi	71			,	
		X	\sqcup		1		SwerveOdometry_Execute.vi					
	X	X	\vdash	X	,		SwerveOdometry_GetPosition.VI SwerveOdometry_New.VI	public Pose2d getPoseMeters() public SwerveDriveOdometry(SwerveDriveKinematics kinematics				
	\ \ \ \	^		^	'		SwerveOdometry_New.vi	Rotation2d gyroAngle, Pose2d initialPose)	5,			
	X	X		X	I		SwerveOdometry_NewZeroCenter.VI	public SwerveDriveOdometry(SwerveDriveKinematics kinematics	5,			
	V		\vdash	V	0/		Communication Department of the Communication of th	Rotation2d gyroAngle)				
	X	X	X	X	51		SwerveOdometry_ResetPosition.VI SwerveOdometry_Update4.VI	public void resetPosition(Pose2d pose, Rotation2d gyroAngle)	For 4 module drives			
	^			^	'		SwerveOdometry_Opdate4.VI SwerveOdometry_UpdateWithTime4.VI		REMOVED			
							SwerveOdometry_UpdateWithTimeX.VI		REMOVED			
	X	X	X	Χ	I		SwerveOdometry_UpdateX.VI		uses array as input			
								public Pose2d updateWithTime(double currentTimeSeconds,	variable parameters (replace with			
								Rotation2d gyroAngle, SwerveModuleState moduleStates) public Pose2d update(Rotation2d gyroAngle,	array and "4" calls) variable parameters (replace with			
								SwerveModuleState moduleStates)	array and "4" calls)			
SWERVE DRIVE MODULE POSITIONS		X	Not	X X X	SI SI SI	Test	VI Name SwerveModulePosition_CompareTo.vi SwerveModulePosition_Equals.vi SwerveModulePosition_Get.vi	Function Prototype	Notes	Ö	<u> </u>	Щ
	X	X		X	SI		SwerveModulePosition_New.vi					
	olemented	Documented	t WPILIB	Menu Item	recution Optimized	st Routine mple Program				de Review	st Program	or Checking
	[m/		Not		ш̂.	Test		Function Prototype	Notes	Š		Err
SWERVE DRIVE MODULE STATE		X	$\perp \perp \perp$	X	SI		SwerveModuleState_CompareTo.vi	public int compareTo(SwerveModuleState o)				
	X	X	\vdash	X	SI SI		SwerveModuleState_Equal.vi SwerveModuleState_Get.vi					
	X	$\frac{1}{X}$	\vdash	X	SI		SwerveModuleState_Get.vi	public SwerveModuleState(double speedMetersPerSecond,	+			
			igsquare					Rotation2d angle)				
	X	X		X	SI		SwerveModuleState_Optimize.vi	public SwerveModuleState optimize(SwerveModuleState desired Rotation2d angle)	d,			
 E												
======	emented	Documented	WPILIB	u Item	Execution Optimized	Test Routine Sample Program	in plant of the state of the st			e Review	Program	r Checking
	тырет	900	Not	Menu	Exe	Test	VI Name	Function Prototype	Notes	Cod	Test	Erro
CUBIC HERMITE SPLINE							`	protected SimpleMatrix getCoefficients()	not needed, use cluster unpack			
	X	X		X			CubicHermiteSpline_getControlVectorFromArrays.vi	private SimpleMatrix getControlVectorFromArrays(double[] initialVector, double[] finalVector)	,			
CODIO HENRITE OF LINE	X	X		X			CubicHermiteSpline_getControlVectorFromArrays.vi CubicHermiteSpline_makeHermiteBasis.vi	private SimpleMatrix getControlVectorFromArrays(double[]	not needed, doe ordered unipaer			_

5 – Update april tag definitions, added													
	X	X		X				CubicHermiteSpline_New.vi	public CubicHermiteSpline(double[] xInitialControlVector, double[] xFinalControlVector, double[] yInitialControlVector, double[]				
		<u></u>							yFinalControlVector)				
POSE WITH CURVATURE	X Implemented	X Documented	Not WPILIB	X Menu Item	ও Execution Optimized	Test Routine		VI Name PoseWithCurve_New.vi	public PoseWithCurvature(Pose2d poseMeters, double curvatureRadPerMeter)	Notes	Code Review	Test Program	Error Checking
										can use cluster constant not needed, use cluster unpack			
										not needed, use cluster unpack			
QUINTIC HERMITE SPLINE	X X Implemented	X Documented	Not WPILIB	X Menu Item	Execution Optimized	Test Routine		VI Name QuinticHermiteSpline_getControlVectorFromArrays.vi QuinticHermiteSpline_makeHermiteBasis.vi	Function Prototype private SimpleMatrix getControlVectorFromArrays(double[] initialVector, double[] finalVector) private SimpleMatrix makeHermiteBasis()	Notes	Code Review	Test Program	Error Checking
	X	X		Χ				QuinticHermiteSpline_New.vi	public QuinticHermiteSpline(double[] xInitialControlVector, double[] xFinalControlVector, double[] yInitialControlVector, double[] yFinalControlVector)				
			\Box		Ш				protected SimpleMatrix getCoefficients()	not needed, use cluster unpack			
SPLINE (Abstract class)	X Implemented	X Documented	Not WPILIB	X Menu Item	Execution Op	Test Routine		VI Name Spline_getPoint.vi	Function Prototype public PoseWithCurvature getPoint(double t) Spline(int degree)	Notes	Code Review	Test Program	Error Checkin
									public static class ControlVector				
					$\overline{}$				public ControlVector(double[] x, double[] y)	implemented as data structure			
	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
SPLINE HELPER		X Documented	Not WPILIB	X Menu Item	Optir	Test Routine	Sample Progra	VI Name SplineHelp_GetCubicCtrlVector.vi	private static Spline.ControlVector getCubicControlVector(double	Notes	Code Review	Test Program	or Che
SPLINE HELPER			Not WPILIB	Menu	Execution Optir	X Test Routine	Sample Progra		private static Spline.ControlVector getCubicControlVector(double scalar, Pose2d point) public static Spline.ControlVector[] getCubicControlVectorsFromWaypoints(Pose2d start,	Notes	Be	Test Program	or Che
SPLINE HELPER	X	X	X	X Wenu	Execution Optir	Test	Sample Progra	SplineHelp_GetCubicCtrlVector.vi SplineHelp_GetCubicCtrlVectorsFromWayPts.vi SplineHelp_GetCubicCtrlVectorsFromWeightedWayPts.vi	private static Spline.ControlVector getCubicControlVector(double scalar. Pose2d point)		Be	Test Program	or Che
SPLINE HELPER	X X X	X X X	X	X X No	Execution Optir	Test	Sample Progra	SplineHelp_GetCubicCtrlVector.vi SplineHelp_GetCubicCtrlVectorsFromWayPts.vi SplineHelp_GetCubicCtrlVectorsFromWeightedWayPts.vi SplineHelp_GetCubicSpline_Calc1.vi	private static Spline.ControlVector getCubicControlVector(double scalar, Pose2d point) public static Spline.ControlVector[] getCubicControlVectorsFromWaypoints(Pose2d start,	internal	Be	Test Program	or Che
SPLINE HELPER	X	X	X X X	X Wenu	Execution Optir	Test	Sample Progra	SplineHelp_GetCubicCtrlVector.vi SplineHelp_GetCubicCtrlVectorsFromWayPts.vi SplineHelp_GetCubicCtrlVectorsFromWeightedWayPts.vi	private static Spline.ControlVector getCubicControlVector(double scalar, Pose2d point) public static Spline.ControlVector[] getCubicControlVectorsFromWaypoints(Pose2d start,		Be	Test Program	or Che
SPLINE HELPER	X X X X	X X X X	X X X	X X No No	্য Execution Optin	Test	Sample Progra	SplineHelp_GetCubicCtrlVector.vi SplineHelp_GetCubicCtrlVectorsFromWayPts.vi SplineHelp_GetCubicCtrlVectorsFromWeightedWayPts.vi SplineHelp_GetCubicSpline_Calc1.vi SplineHelp_GetCubicSpline_Calc2.vi	private static Spline.ControlVector getCubicControlVector(double scalar, Pose2d point) public static Spline.ControlVector[] getCubicControlVectorsFromWaypoints(Pose2d start, Translation2d[] interiorWaypoints, Pose2d end) public static CubicHermiteSpline[] getCubicSplinesFromControlVectors(Spline.ControlVector start, Translation2d[] waypoints, Spline.ControlVector end) private static Spline.ControlVector getQuinticControlVector(double	internal internal internal	Be	Test Program	or Che
SPLINE HELPER	X X X X X	X X X X X	X X X	X X No No No X	্য Execution Optin	X	Sample Progra	SplineHelp_GetCubicCtrlVector.vi SplineHelp_GetCubicCtrlVectorsFromWayPts.vi SplineHelp_GetCubicCtrlVectorsFromWeightedWayPts.vi SplineHelp_GetCubicSpline_Calc1.vi SplineHelp_GetCubicSpline_Calc2.vi SplineHelp_GetCubicSpline_Calc3.vi SplineHelp_getCubicSplinesFromControlVectors.vi SplineHelp_getCubicSplinesFromControlVectors.vi	private static Spline.ControlVector getCubicControlVector(double scalar, Pose2d point) public static Spline.ControlVector[] getCubicControlVectorsFromWaypoints(Pose2d start, Translation2d[] interiorWaypoints, Pose2d end) public static CubicHermiteSpline[] getCubicSplinesFromControlVectors(Spline.ControlVector start, Translation2d[] waypoints, Spline.ControlVector end) private static Spline.ControlVector getQuinticControlVector(double scalar, Pose2d point) public static List <spline.controlvector> getQuinticControlVectorsFromWaypoints(List<pose2d> waypoints)</pose2d></spline.controlvector>	internal internal internal REMOVED 2762	Be	Test Program	or Che
SPLINE HELPER	X X X X X	X X X X X X	X X X	X X No No No X	্য Execution Optin	X	Sample Progra	SplineHelp_GetCubicCtrlVector.vi SplineHelp_GetCubicCtrlVectorsFromWayPts.vi SplineHelp_GetCubicCtrlVectorsFromWeightedWayPts.vi SplineHelp_GetCubicSpline_Calc1.vi SplineHelp_GetCubicSpline_Calc2.vi SplineHelp_GetCubicSpline_Calc3.vi SplineHelp_getCubicSplinesFromControlVectors.vi SplineHelp_GetQuinticCtrlVector.vi	private static Spline.ControlVector getCubicControlVector(double scalar, Pose2d point) public static Spline.ControlVector[] getCubicControlVectorsFromWaypoints(Pose2d start, Translation2d[] interiorWaypoints, Pose2d end) public static CubicHermiteSpline[] getCubicSplinesFromControlVectors(Spline.ControlVector start, Translation2d[] waypoints, Spline.ControlVector end) private static Spline.ControlVector getQuinticControlVector(double scalar, Pose2d point) public static List <spline.controlvector> getQuinticControlVectorsFromWaypoints(List<pose2d> waypoints) public static QuinticHermiteSpline[] getQuinticSplinesFromControlVectors(Spline.ControlVector[]</pose2d></spline.controlvector>	internal internal internal	Be	Test Program	or Che
SPLINE HELPER	X	x x x x x x	X X X	X X No No No X X	্য Execution Optin	X	Sample Progra	SplineHelp_GetCubicCtrlVectorsFromWayPts.vi SplineHelp_GetCubicCtrlVectorsFromWeightedWayPts.vi SplineHelp_GetCubicSpline_Calc1.vi SplineHelp_GetCubicSpline_Calc2.vi SplineHelp_GetCubicSpline_Calc3.vi SplineHelp_GetCubicSpline_Calc3.vi SplineHelp_getCubicSplinesFromControlVectors.vi SplineHelp_GetQuinticCtrlVector.vi SplineHelp_GetQuinticCtrlVectorsFromWayPts.vi	private static Spline.ControlVector getCubicControlVector(double scalar, Pose2d point) public static Spline.ControlVector[] getCubicControlVectorsFromWaypoints(Pose2d start, Translation2d[] interiorWaypoints, Pose2d end) public static CubicHermiteSpline[] getCubicSplinesFromControlVectors(Spline.ControlVector start, Translation2d[] waypoints, Spline.ControlVector end) private static Spline.ControlVector getQuinticControlVector(double scalar, Pose2d point) public static List <spline.controlvector> getQuinticControlVectorsFromWaypoints(List<pose2d> waypoints) public static QuinticHermiteSpline[] getQuinticSplinesFromControlVectors(Spline.ControlVector[] controlVectors)</pose2d></spline.controlvector>	internal internal internal REMOVED 2762	Be	Test Program	or Che

Revision 2025.0 1/7/2025 – Update april tag definitions,													
		Χ .	X	No)			SplineHelp_ThomasAlgorithm.vi	private static void thomasAlgorithm(double[] a, double[] b, double c, double[] d, double[] solutionVector)	[] internal			
			Documented - Not WPILIB			Test Routine		VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
SPLINE PARAMETEI	RIZER	X .	X	X				SplineParam_Spline_T0_T1.vi	public static List <posewithcurvature> parameterize(Spline spline double t0, double t1)</posewithcurvature>	e,			
		Χ .	X	X		X		SplineParam_Spline.vi	public static List <posewithcurvature> parameterize(Spline spline</posewithcurvature>	9)			
		x .	x x	No	,			SplineParam_StackGet.vi		internal			
			X X X X					SplineParam_StackPop.vi SplineParam_StackPush.vi		internal internal			
		X .	<u> </u>	NO)			SpilneParam_StackPusn.vi		internal			
======== TRAJECTORY ==========					nized		æ						
		mplemented	Documented Not WPILIB	Menu Item	Execution Optin	Test Routine	Sample Progran	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
TRAJEC	TORY	\overline{X}	\overline{X}			7	0)	Trajectory_Concatenate.vi				7	
			X	X				Trajectory_equals.vi	boolean equals(other obj)	FUTURE			
			X X	$\frac{X}{X}$	SI			Trajectory_GetStates.vi Trajectory_GetTotalTime.vi	public List <state> getStates() public double getTotalTimeSeconds()</state>	not needed, use unpack not needed, use unpack			
			X	No				Trajectory_lerp_double.vi	private static double lerp(double startValue, double endValue,	internal			
		x .	X	No	SI			Trajectory_lerp_Pose.vi	double t) private static Pose2d lerp(Pose2d startValue, Pose2d endValue,	internal			
		X .	Y		SI			Trajectory_New_Empty.vi	double t)				
		\hat{X}	X	$\frac{1}{X}$	SI			Trajectory_New.vi	public Trajectory(final List <state> states)</state>				
			X	X				Trajectory_RelativeTo.vi	public Trajectory relativeTo(Pose2d pose)				
			X X	X				Trajectory_Sample.vi Trajectory_SampleReverse.vi	public State sample(double timeSeconds)	Sample in reverse order. Negate			
			X	X				Trajectory_TransformBy.vi	public Trajectory transformBy(Transform2d transform)	sample.			
		^ .	^	+^				Trajectory_Transformby.vr	public Pose2d getInitialPose()	can use cluster unpack, array index			
TRAJECTORY_S		X . X .	Not WPILIB	X Wen	SI SI	Test Routine		VI Name TrajectoryState_Equals.vi TrajectoryState_GetAll.vi TrajectoryState_GetPose.vi TrajectoryState_Interpolate.vi TrajectoryState_New.vi	Function Prototype boolean equals(other obj) State interpolate(State endValue, double i) public State(double timeSeconds, double velocityMetersPerSecond, double accelerationMetersPerSecondSq, Pose2d poseMeters, double curvatureRadPerMeter) public State()	Notes	Code Review	Test Program	Error Checking
TRAJECTORY CO	ONFIG	X Implemented	X Documented Not WPILIB			Test Routine	Sample Program	VI Name TrajectoryConfig_AddConstraint.vi	Function Prototype public TrajectoryConfig addConstraint(TrajectoryConstraint constraint)	Notes Implemented differently, can't duplicate.	Code Review	Test Program	Error Checking

WPILib LabVIEW Math Library – VI Implementation List Revision 2025.0 1/7/2025 – Update april tag definitions, added n

ed new	field.						
X	X		X		TrajectoryConfig_AddConstraints.vi	public TrajectoryConfig addConstraints(List extends TrajectoryConstraint constraints)	Implemented differently, can't duplicate.
X	X		Х	SI	TrajectoryConfig_Create.vi	public TrajectoryConfig(double maxVelocityMetersPerSecond, double maxAccelerationMetersPerSecondSq)	
X	X		X		TrajectoryConfig_GetCentripetalAccel.vi	"	
X	X	X	Х		TrajectoryConfig_GetConstraints.vi	public List <trajectoryconstraint> getConstraints()</trajectoryconstraint>	Implemented differently, can't duplicate.
X	X		Χ		TrajectoryConfig GetEndVelocity.vi	public double getEndVelocity()	can use cluster unpack
X	X		Χ		TrajectoryConfig GetKinematicsDiffDrive.vi		
X	X		Χ		TrajectoryConfig_GetKinematicsMecanumfDrive.vi		
X	X		X		TrajectoryConfig_GetKinematicsSwerveDrive.vi		
X	X	X	X		TrajectoryConfig_GetMaxVelAccel.vi		
X	X		Χ		TrajectoryConfig_GetStartVelocity.vi	public double getStartVelocity()	can use cluster unpack
X	X		Χ		TrajectoryConfig_GetVoltageDiffDrive.vi		
X	X		X		TrajectoryConfig_IsReversed.vi	public boolean isReversed()	can use cluster unpack
X	X	X	X	SI	TrajectoryConfig_setCentripetalAccel.vi		
X	X		X		TrajectoryConfig_SetEndVelocity.vi	public TrajectoryConfig setEndVelocity(double endVelocityMetersPerSecond)	
X	X		X	SI	TrajectoryConfig_setKinematicsDiffDrive.vi	public TrajectoryConfig setKinematics(DifferentialDriveKinematics kinematics)	
X	X		X	SI	TrajectoryConfig_setKinematicsMecanumfDrive.vi	public TrajectoryConfig setKinematics(MecanumDriveKinematics kinematics)	
X	X		Х	SI	TrajectoryConfig_setKinematicsSwerveDrive.vi	public TrajectoryConfig setKinematics(SwerveDriveKinematics kinematics)	
X	X		Χ	SI	TrajectoryConfig_setReversed.vi	public TrajectoryConfig setReversed(boolean reversed)	
X	X		Х		TrajectoryConfig_SetStartVelocity.vi	public TrajectoryConfig setStartVelocity(double startVelocityMetersPerSecond)	
Χ	X	Χ	Χ	SI	TrajectoryConfig_setVoltageDiffDrive.vi		
						public double getMaxVelocity()	Created function to return both
						public double getMaxAcceleration()	Created function to return both
						NOTE ADD OTHER "CET" DOLLTINES FOR OTHER	

NOTE ADD OTHER "SET" ROUTINES FOR OTHER CONTRAINTS HERE, SINCE NEW CONTRAINTS ARE

									SPECIFIC AND NOT GENERIC.				
	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	∕l Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
TRAJECTORY GENERATE	Х	X		X			-	rajectoryGenerate_Make_Cubic_CtrlVect.vi	public static Trajectory generateTrajectory(Spline.ControlVector initial, List <translation2d> interiorWaypoints, Spline.ControlVector end TrajectoryConfig config.)</translation2d>	uses cubic splines			
	Х	Χ		X				rajectoryGenerate_Make_Cubic.vi	end, TrajectoryConfig config) public static Trajectory generateTrajectory(Pose2d start, List <translation2d> interiorWaypoints, Pose2d end, TrajectoryConfig config)</translation2d>	uses cubic splines			
	Χ	Χ	Х	Х			-	rajectoryGenerate Make Generic.vi	TrajectoryConfig config) Helper to bring these all together	Use this one!!!			
	X	X		X				rajectoryGenerate_Make_Quintic_CtrlVect.vi	public static Trajectory generateTrajectory(ControlVectorList controlVectors, TrajectoryConfig config)	uses quintic splines			
	Χ	Χ	X	X			-	rajectoryGenerate Make Quintic Weighted.vi	, , , , , , , , , , , , , , , , , , , ,	New 2762			
	Х	X		Х				rajectoryGenerate_Make_Quintic.vi	public static Trajectory generateTrajectory(List <pose2d> waypoints, TrajectoryConfig config)</pose2d>	uses quintic splines			
	X	Χ		X				rajectoryGenerate_splinePointsFromSplines.vi	public static List <posewithcurvature> splinePointsFromSplines(Spline[] splines)</posewithcurvature>				
TRAJECTORY GENERATE (Control Vector)	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	∕I Name	Function Prototype public ControlVectorList(int initialCapacity)	Notes may not need, just data	Code Review	Test Program	Error Checking
									public ControlVectorList()	may not need, just data			
									public ControlVectorList(Collection extends Spline.ControlVector collection)	may not need, just data			

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025.0 1/7/2025 – Update april tag definitions, adde	ed new fi	eiu.		7							
	Implemented	Documented	Not WPILIB	Menu Item Execution Optimized		Sample Program	Function Prototype	Notes	Code Review	Test Program	Error Checking
TRAJECTORY PARAMETERIZ	EX		XΛ	Vo		TrajectoryParam_calcStuffFwd.vi	7				
	X		XΛ			TrajectoryParam_calcStuffRev.vi					
	X	X		Vo .		TrajectoryParam_enforceAccel.vi	private static void enforceAccelerationLimits(boolean reverse, List <trajectoryconstraint> constraints, ConstrainedState state)</trajectoryconstraint>	This routines needs to be changed when new constraints are added.			
	X			Vo		TrajectoryParam_enforceVelocity.vi		This routines needs to be changed when new constraints are added.			
	X	X		X		TrajectoryParam_timeParam.vi	public static Trajectory timeParameterizeTrajectory(List <posewithcurvature> points. List<trajectoryconstraint> constraints, double startVelocityMetersPerSecond, double endVelocityMetersPerSecond, double maxVelocityMetersPerSecond, double maxAccelerationMetersPerSecondSq, boolean reversed)</trajectoryconstraint></posewithcurvature>				
CTORY PARAMETERIZE CONSTRAINED STAT	Mplemented	X Documented	8 5	X Menu Item Execution Optimized	Test Routine	VI Name ConstrainedState_New.vi	Function Prototype ConstrainedState(PoseWithCurvature pose, double	Notes	Code Review	Test Program	Error Checking
							distanceMeters, double maxVelocityMetersPerSecond, double minAccelerationMetersPerSecondSq, double maxAccelerationMetersPerSecondSq)				
	X	Χ	X X	X		ConstrainedState_SetMaxAccel.vi	U				
		~	V 1	ΧI	- 1	ConstrainedState_SetMinAccel.vi					
			X								
	X	X	X	X		ConstrainedState_SetVelAccel.vi					
		X	X	X			ConstrainedState()				
TRAJECTORY UTI	X X X X X X X X X X	No X X	Not WPILIB	Menu Item X X Execution Optimized	Test Routine	ConstrainedState_SetVelAccel.vi ConstrainedState_SetVelocity.vi	Function Prototype	Notes	Code Review	Test Program	Error Checking
TRAJECTORY UTI	X X Implemented	X X Documented X X	X X X X X X X X X X X X X X X X X X X	X X Wenu Item X X X Execution Optimized		ConstrainedState_SetVelAccel.vi ConstrainedState_SetVelocity.vi VI Name TrajectoryUtil_fromPathWeaverJSON.vi TrajectoryUtil_MakeWeightedWayPoint_ENG.vi		Notes	Code Review	Test Program	Error Checking
TRAJECTORY UTI	X X X Implemented	X X Documented X X X X	X X X X X X X X X X X X X X X X X X X	X X Wenu Item X X X X X X X X X X X X X X X X X X X		ConstrainedState_SetVelAccel.vi ConstrainedState_SetVelocity.vi ### ConstrainedState_SetVelocity.vi ### ConstrainedState_SetVelocity.vi ### ConstrainedState_SetVelocity.vi ### ConstrainedState_SetVelAccel.vi ### ConstrainedState_SetVelAccel.vi #### ConstrainedState_SetVelAccel.vi #### ConstrainedState_SetVelAccel.vi #### ConstrainedState_SetVelAccel.vi #### ConstrainedState_SetVelAccel.vi ##### ConstrainedState_SetVelAccel.vi ###################################	Function Prototype public static Trajectory fromPathweaverJson(Path path)	Notes	Code Review	Test Program	Error Checking
TRAJECTORY UTI	X X Implemented	X X Documented X X	X X X X X X X X X X X X X X X X X X X	X X Wenu Item X X X Execution Optimized		ConstrainedState_SetVelAccel.vi ConstrainedState_SetVelocity.vi VI Name TrajectoryUtil_fromPathWeaverJSON.vi TrajectoryUtil_MakeWeightedWayPoint_ENG.vi	Function Prototype public static Trajectory fromPathweaverJson(Path path) public static void toPathweaverJson(Trajectory trajectory, Path	Notes	Code Review	Test Program	Error Checking
TRAJECTORY UTI	X X X Implemented	X X Documented X X X X	X X X X X X X X X X X X X X X X X X X	X X Wenu Item X X X X X X X X X X X X X X X X X X X		ConstrainedState_SetVelAccel.vi ConstrainedState_SetVelocity.vi ### ConstrainedState_SetVelocity.vi ### ConstrainedState_SetVelocity.vi ### ConstrainedState_SetVelocity.vi ### ConstrainedState_SetVelAccel.vi ### ConstrainedState_SetVelAccel.vi #### ConstrainedState_SetVelAccel.vi #### ConstrainedState_SetVelAccel.vi #### ConstrainedState_SetVelAccel.vi #### ConstrainedState_SetVelAccel.vi ##### ConstrainedState_SetVelAccel.vi ###################################	Function Prototype public static Trajectory fromPathweaverJson(Path path) public static void toPathweaverJson(Trajectory trajectory, Path path) public static Trajectory deserializeTrajectory(String json)	Notes	Code Review	Test Program	Error Checking
TRAJECTORY UTI	X X X Implemented	X X Documented X X X X	X X X X X X X X X X X X X X X X X X X	X X Wenu Item X X X X X X X X X X X X X X X X X X X		ConstrainedState_SetVelAccel.vi ConstrainedState_SetVelocity.vi ### ConstrainedState_SetVelocity.vi ### ConstrainedState_SetVelocity.vi ### ConstrainedState_SetVelocity.vi ### ConstrainedState_SetVelAccel.vi ### ConstrainedState_SetVelAccel.vi #### ConstrainedState_SetVelAccel.vi #### ConstrainedState_SetVelAccel.vi #### ConstrainedState_SetVelAccel.vi #### ConstrainedState_SetVelAccel.vi ##### ConstrainedState_SetVelAccel.vi ###################################	Function Prototype public static Trajectory fromPathweaverJson(Path path) public static void toPathweaverJson(Trajectory trajectory, Path path)	Notes	Code Review	Test Program	Error Checking
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	X X X Implemented X X X X X X X X X X X X X X X X X X X	X X Documented X X X X X	Not WPILIB	X X Menu Item X X X Menu Item X X X X Menu Item X X X X Execution Optimized	Routine	ConstrainedState_SetVelAccel.vi ConstrainedState_SetVelocity.vi VI Name TrajectoryUtil_fromPathWeaverJSON.vi TrajectoryUtil_MakeWeightedWayPoint_ENG.vi TrajectoryUtil_MakeWeightedWayPoint.vi TrajectoryUtil_toPathWeaverJSON.vi TrajectoryUtil_toPathWeaverJSON.vi VI Name TrapProfConstraint_New.vi TrapProfile_Calculate.vi TrapProfile_Direct.vi	Function Prototype public static Trajectory fromPathweaverJson(Path path) public static void toPathweaverJson(Trajectory trajectory, Path path) public static Trajectory deserializeTrajectory(String json) public static String serializeTrajectory(Trajectory trajectory)		Code Review	Test Program	Error Checking
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	X X X X X X X X X X X X X X X X X X X	X X Documented X X X X X X X X X X X X X X X X X X X	X	N X X X X X X X X X X X X X X X X X X X	Test Routine	ConstrainedState_SetVelAccel.vi ConstrainedState_SetVelocity.vi VI Name TrajectoryUtil_fromPathWeaverJSON.vi TrajectoryUtil_MakeWeightedWayPoint_ENG.vi TrajectoryUtil_MakeWeightedWayPoint.vi TrajectoryUtil_toPathWeaverJSON.vi TrajectoryUtil_toPathWeaverJSON.vi TrapProfile_Calculate.vi TrapProfile_Calculate.vi TrapProfile_Execute.vi TrapProfile_Execute.vi TrapProfile_ISFinished.vi TrapProfile_New_UpeInitial.vi TrapProfile_New_Vi TrapProfile_ShouldFlipAcceleration.vi	Function Prototype public static Trajectory fromPathweaverJson(Path path) public static void toPathweaverJson(Trajectory trajectory, Path path) public static Trajectory deserializeTrajectory(String json) public static String serializeTrajectory(Trajectory trajectory)	Notes	Code Review	Test Program	Error Checking
	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X	X X X Menu Item X X X X Menu Item X X X X X X X X X X X X X X X X X X X	Test Routine	ConstrainedState_SetVelocity.vi ConstrainedState_SetVelocity.vi VI Name TrajectoryUtil_fromPathWeaverJSON.vi TrajectoryUtil_MakeWeightedWayPoint_ENG.vi TrajectoryUtil_MakeWeightedWayPoint.vi TrajectoryUtil_toPathWeaverJSON.vi TrajectoryUtil_toPathWeaverJSON.vi TrapProfile_Calculate.vi TrapProfile_Calculate.vi TrapProfile_Direct.vi TrapProfile_Execute.vi TrapProfile_Execute.vi TrapProfile_IsFinished.vi TrapProfile_New.vi TrapProfile_ShouldFlipAcceleration.vi TrapProfile_ShouldFlipAcceleration.vi TrapProfile_ShouldFlipAcceleration.vi TrapProfile_TimeLeftUntil.vi	Function Prototype public static Trajectory fromPathweaverJson(Path path) public static void toPathweaverJson(Trajectory trajectory, Path path) public static Trajectory deserializeTrajectory(String json) public static String serializeTrajectory(Trajectory trajectory)	Notes Private, remove from menu	Code Review	Test Program	Error Checking
	X X X X X X X X X X X X X X X X X X X	X X Documented X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X	N X X X X X X X X X X X X X X X X X X X	Test Routine	ConstrainedState_SetVelAccel.vi ConstrainedState_SetVelocity.vi VI Name TrajectoryUtil_fromPathWeaverJSON.vi TrajectoryUtil_MakeWeightedWayPoint_ENG.vi TrajectoryUtil_MakeWeightedWayPoint.vi TrajectoryUtil_toPathWeaverJSON.vi TrajectoryUtil_toPathWeaverJSON.vi TrapProfile_Calculate.vi TrapProfile_Calculate.vi TrapProfile_Execute.vi TrapProfile_Execute.vi TrapProfile_ISFinished.vi TrapProfile_New_UpeInitial.vi TrapProfile_New_Vi TrapProfile_ShouldFlipAcceleration.vi	Function Prototype public static Trajectory fromPathweaverJson(Path path) public static void toPathweaverJson(Trajectory trajectory, Path path) public static Trajectory deserializeTrajectory(String json) public static String serializeTrajectory(Trajectory trajectory)	Notes Private, remove from menu	Code Review	Test Program	Error Checking

Revision 2025.0 1/7/2025 – Update april tag definitions, added new field.

'======== TRAJECTORY CONSTRAINT '========= Menu Item Function Prototype VI Name Notes CENTRIPETAL ACCELERATION CONSTRAINT X CentripetalAccelConstraint getMaxVelocity.vi public double getMaxVelocityMetersPerSecond(Pose2d poseMeters, double curvatureRadPerMeter, double velocityMetersPerSecond) public MinMax XX Χ CentripetalAccelConstraint_getMinMaxAccel.vi getMinMaxAccelerationMetersPerSecondSq(Pose2d poseMeters, double curvatureRadPerMeter, double velocityMetersPerSecond) public CentripetalAccelerationConstraint(double XX X SI CentripetalAccelConstraint_New.vi Can use cluster pack for now maxCentripetalAccelerationMetersPerSecondSq) Test Routine Vot WPILIB Function Prototype Notes public double getMaxVelocityMetersPerSecond(Pose2d poseMeters, double curvatureRadPerMeter, double velocityMetersPerSecond) DIFF DRIVE KINEMATIC CONSTRAINT X DiffDriveKinematicsConstraint getMaxVelocity.vi DiffDriveKinematicsConstraint_getMinMaxAccel.vi public MinMax getMinMaxAccelerationMetersPerSecondSq(Pose2d poseMeters, double curvatureRadPerMeter, double velocityMetersPerSecond) public DifferentialDriveKinematicsConstraint(final DiffDriveKinematicsConstraint New.vi SI Χ DifferentialDriveKinematics kinematics, double maxSpeedMetersPerSecond) Fest Routine Function Prototype VI Name Notes DIFF DRIVE VOLTAGE CONSTRAINT X DiffDriveVoltageConstraint getMaxVelocity.vi public double getMaxVelocityMetersPerSecond(Pose2d poseMeters, double curvatureRadPerMeter, double velocityMetersPerSecond) XX Χ DiffDriveVoltageConstraint_getMinMaxAccel.vi public MinMax getMinMaxAccelerationMetersPerSecondSq(Pose2d poseMeters, double curvatureRadPerMeter, double velocityMetersPerSecond) X XX SI DiffDriveVoltageConstraint New.vi DifferentialDriveVoltageConstraint(SimpleMotorFeedforward feedforward, DifferentialDriveKinematics kinematics, double maxVoltage) Function Prototype Notes ELLIPTICAL REGION CONSTRAINT X EllipRegionConstraint_getMaxVelocity.vi X EllipRegionConstraint_getMinMaxAccel.vi XX Χ EllipRegionConstraint_IsPoseInRegion.vi EllipRegionConstraint New.vi

FRC_LabVIEW_Trajectory_Library_Routines.xlsx

Revision 2025.0 1/7/2025 – Update april tag definitions, added new field. Function Prototype Notes JERK CONSTRAINT / JerkConstraint_getMaxVelocity.vi Routine exists, it is just a shell **FUTURE** JerkConstraint getMinMaxAccel.vi Routine exists, it is just a shell SI JerkConstraint New.vi Routine exists, it is just a shell **FUTURE** Function Prototype Notes MAX VELOCITY CONSTRAINT MaxVelocityConstraint_getMaxVelocity.vi $X \mid X$ X SI X SI X SI MaxVelocityConstraint_getMinMaxAccel.vi MaxVelocityConstraint_New.vi Function Prototype Notes MECANUM DRIVE KINEMATICS CONSTRAINT X X Χ MecaDriveKinematicsConstraint_getMaxVelocity.vi MecaDriveKinematicsConstraint_getMinMaxAccel.vi XX X SI MecaDriveKinematicsConstraint New.vi Function Prototype RECTANGULAR REGION CONSTRAINT X XX RectRegionConstraint getRectRegion.vi XX RectRegionConstraint_getMinMaxAccel.vi XX Χ RectRegionConstraint IsPoseInRegion.vi RectRegionConstraint_New.vi VI Name Function Prototype Notes SWERVE DRIVE KINEMATICS CONSTRAINT SwerveDriveKinematicsConstraint_getMaxVelocity.vi public double getMaxVelocityMetersPerSecond(Pose2d poseMeters, double curvatureRadPerMeter, double velocityMetersPerSecond)
public MinMax XX SwerveDriveKinematicsConstraint_getMinMaxAccel.vi Χ getMinMaxAccelerationMetersPerSecondSq(Pose2d poseMeters, double curvatureRadPerMeter, double velocityMetersPerSecond) Newpublic SwerveDriveKinematicsConstraint(final SwerveDriveKinematicsConstraint New.vi X SI Can use cluster pack for now SwerveDriveKinematics kinematics, double maxSpeedMetersPerSecond) Test Routine Vot WPILIB Menu Item Function Prototype Notes

FRC_LabVIEW_Trajectory_Library_Routines.xlsx

WPILib LabVIEW Math Library – VI Implementation List
Revision 2025.0 1/7/2025 – Update april tag definitions, added new field.

TRAJECTORY CONSTRAINT X X

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Г	X	X	Χ	Χ	TrajConstraint_GetMaxVelocity.vi	
	X	Χ	Χ	Χ	TrajConstraint_GetMinMaxAccel.vi	
	X	Χ	Χ	Χ	TrajConstraint_GetType.vi	

Function Prototype TRAJECTORY CONSTRAINT (Min Max) X X SI X SI Constraint_MinMax_New Constraint_MinMax_New.vi XX Constraint_MinMax_NewMinMax.VI Constraint_MinMax_New

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UTILITY '=======

Function Prototype FileUtil_AddExt.vi FileUtil_DefaultDir.vi

THESE ROUTINES ARE SPECIFIC TO LABVIEW. THEY DO NOT HAVE A JAVA / C++ WPILIB EQUIVALENT

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
UTIL	Χ	Χ	Χ	X	SI			Util_ApproxEqual.vi		
	Χ	Χ	Χ	Χ				Util_Array_PoseWCurv_to_XY.vi		
	Χ	Χ	Χ	Χ	SI			Util_CalcDist.vi		
	Χ	Χ	Χ	Χ	SI			Util_GetLibraryVersion.vi		
	Χ	Χ	Χ	Χ	SI			Util_GetLibUsage.vi		
	X	X	X	X				Util_GetTime.vi		Once tested completely, this should be optimized!
	Χ	Χ	Χ	No	- 1			Util_GetTime_U32.vi		
	Χ	Χ	Χ	No	- 1			Util_GetTime_U64.vi		
	Χ	Χ	Χ	No	N/A			Util_LibraryGlobals.vi		Global Variables – no block diag.
	Χ	Χ	Χ	Χ				Util_Trajectory_Absolute_To_Relative.vi		
	Χ	Χ	Χ	X				Util_Trajectory_ReadFile.vi		
	Χ	Χ	Χ	Χ				Util_Trajectory_to_XY.vi		
	Χ	Χ	Χ	No				Util_Trajectory_WriteFile_Config.vi		internal
	Χ	Χ	Χ	No				Util_Trajectory_WriteFile_OneState.vi		internal
	Χ	Χ	Χ	Χ				Util_Trajectory_WriteFile_PathFinder.vi		
	Χ	Χ	Χ	No				Util_Trajectory_WriteFile_PathFinderConfig.vi		internal
	Χ	Χ	Χ	Χ				Util_Trajectory_WriteFile_Pathweaver.vi		
	Χ	Χ	Χ	No				Util_Trajectory_WriteFile_States.vi		internal
	Χ	Χ	Χ	No				Util_Trajectory_WriteFile_WayPoints.vi		internal
	Χ	Χ	Χ	Χ				Util_Trajectory_WriteFile.vi		
	Χ	Χ	Χ	Χ				Util_TrajectoryState_Meters_To_Inches.vi		
	Χ	Χ	Χ	Χ				Util_TrajState_to_DiffDrive_WheelPos.vi		
ļ	Χ	Χ	Χ	Χ				Util_DispWaypoint_Eng_To_Sl.vi		
Į	Χ	Χ	Χ	Χ				Util_DispWaypoint_To_CubicInput.vi		
	Χ	Χ	Χ	Χ				Util_DispWaypoint_To_QuinticInput.vi		
Ĺ	Χ	Χ	Χ	X				Util_DispWeightedWaypiont_Eng_To_WeightedWaypoint		
[Χ	Χ	Χ	No				Util_DispWeightedWayPoint_To_WeightedWayPoint.vi		Sorry about the confusing name

'======= CONVERSIONS '========

WPILib LabVIEW Math Library – VI Implementation List
Revision 2025.0 1/7/2025 – Update april tag definitions, added new field.
THESE ROUTINES ARE SPECIFIC TO LABVIEW. THEY DO NOT HAVE A
JAVA / C++ WPILIB EQUIVALENT

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
CONV	Χ	Χ	Χ	X	SI			Conv_AngleDegrees_Heading.vi		
	Χ	Χ	Χ	X	SI			Conv_AngleRadians_Heading.vi		
	Χ	Χ	Χ	Χ	SI			Conv_Centimeters_Meters.vi		
	Χ	Χ	Χ	Χ	SI			Conv_Deg_Radians.vi		
	Χ	Χ	Χ	Χ	SI			Conv_Deg_Rotations.vi		
	Χ	Χ	Χ	X	SI			Conv_Feet_Meters.vi		
	Χ	Χ	Χ	Χ	SI			Conv_GyroDegrees_Heading.vi		
	Χ	Χ	Χ	X	SI			Conv_Heading_AngleRadians.vi		
	Χ	Χ	Χ	X	SI			Conv_Inches_Meters.vi		
	Χ	Χ	Χ	X	SI			Conv_Kilograms_Pounds.vi		
	Χ	Χ	Χ	X	SI			Conv_Meters_Feet.vi		
	Χ	Χ	Χ	Χ	SI			Conv_Meters_Inches.vi		
	Χ	Χ	Χ	X	SI			Conv_Pose2d_SI_Eng.vi		
	Χ	Χ	Χ	X	SI			Conv_Pounds_Kilograms.vi		
	Χ	Χ	Χ	X	SI			Conv_Radians_Deg.vi		
	Χ	Χ	X	X	SI			Conv_Radians_Rotations.vi		
	Χ	X	X	X	SI			Conv_Rotations_Deg.vi		
	Χ	Χ	X	X	SI			Conv_Rotations_Radians.vi		
	Χ	Χ	X	X	SI			Conv_Yards_Meters.vi		

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optii	Test Routine	Sample Progra	VI Name	Function Prototype	Notes
UNITS	Χ	X		Χ	SI			Units_DegreesToRadians.vi		
	Χ	X		Χ	SI			Units_DegreesToRotations.vi		
	Χ	X		Χ	SI			Units_FeetToMeters.vi		
	Χ	X		Χ	SI			Units_InchesToMeters.vi		
	X	X		Χ	SI			Units_MetersToFeet.vi		
	X	X		Χ	SI			Units_MetersToInches.vi		
	X	X		Χ	SI			Units_MillisecondsToSeconds.vi		
	X	X		Χ	SI			Units_RadiansPerSecondToRotationsPerMinute.vi		
	X	X		Χ	SI			Units_RadiansToDegrees.vi		
	X	X		Χ	SI			Units_RadiansToRotations.vi		
	X	X		Χ	SI			Units_RotationsPerMinuteToRadiansPerSecond.vi		
	X	X		Χ	SI			Units_RotationsToDegrees.vi		
	X	X		Χ	SI			Units_RotationsToRadians.vi		
	X	X		Χ	SI			Units_SecondsToMilliseconds.vi		

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PATHFINDER UTIL

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THESE ROUTINES ARE SPECIFIC TO LABVIEW. THEY DO NOT HAVE A JAVA / C++ WPILIB EQUIVALENT

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimizea	Test Routine	Sample Program	Function Prototype	Notes
PATHFINDERUTIL	Χ	X	Χ	Χ			PathfinderUtil_Continuous_Heading_Difference.vi		
	Χ	X	Χ	Χ			PathfinderUtil_OptimizeTrajectoryStates.vi		
	Χ	X	Χ	Χ			PathfinderUtil_ToTrajectory.vi		
	X	X	X	X			PathfinderI Itil ToTrajectoryStates vi		

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STATE SPACE MODEL

FRC_LabVIEW_Trajectory_Library_Routines.xlsx

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	me	V I	ı Item	Execution	Ple i			R	Progra	ઇ
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DC MOTOR			X	SI SI	DCMotor_GetAndymark9015.vi DCMotor_GetAndymarkAM2235A.vi					
	X X X X		X	SI	DCMotor_GetAndymarkAM3493.vi					
	X X		X		DCMotor_GetAndymarkRs775_125.vi					
	XX		X		DCMotor_GetBag.vi					
	XX		Χ	SI	DCMotor_GetBanebotsRs550.vi					
	XX		X	SI	DCMotor_GetBanebotsRs775.vi					
	XX		X	SI	DCMotor_GetCIM.vi					
	X X	,	X	SI	DCMotor_GetCurrent.vi DCMotor_GetFalcon500.vi					
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	X X		\hat{x}	SI	DCMotor GetNEO.vi					
	XX		X	SI	DCMotor_GetNEO550.vi					
	XX	(X	SI	DCMotor_GetRomiBuiltIn.vi					
	XX		X	SI	DCMotor_GetSpeed.vi					
	XX		X	SI	DCMotor_GetTorque.vi					
	X X X X		X		DCMotor_GetVex775Pro.vi DCMotor_New.vi					
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LINEAR SYSTEM IN	<u> </u>		Menu	Execution	S VI Name InparSystemId CreateDCMotorSystem vi	Function Prototype	Notes	Code Rev	Test Prog	Error Ch
LINEAR SYSTEM ID	X X		X Wenn	Execution	LinearSystemId_CreateDCMotorSystem.vi	Function Prototype		Code Rev	Test Prog	Error Ch
LINEAR SYSTEM ID	X X X		X Wenu	Executiv	LinearSystemId_CreateDCMotorSystem.vi LinearSystemId_CreateDriveTrainVelocitySystem.vi	Function Prototype	Update to use create matrix	Code Rev	Test Prog	Error Ch
LINEAR SYSTEM ID	X X X X X X X X X		X X X	Execution	LinearSystemId_CreateDCMotorSystem.vi LinearSystemId_CreateDriveTrainVelocitySystem.vi LinearSystemId_CreateElevatorSystem.vi LinearSystemId_CreateFlywheelSystem.vi	Function Prototype		Code Rev	Test Prog	Error Ch
LINEAR SYSTEM ID	X X X X X X X X X X X X X X X X X X X		X X X X		LinearSystemId_CreateDCMotorSystem.vi LinearSystemId_CreateDriveTrainVelocitySystem.vi LinearSystemId_CreateElevatorSystem.vi LinearSystemId_CreateFlywheelSystem.vi LinearSystemId_CreateSingleJointedArmSystem.vi	Function Prototype	Update to use create matrix Update to use create matrix	Code Rev	Test Prog	Error Ch
LINEAR SYSTEM ID	X X X X X X X X X X X X X X X X X X X		X X X X X	SI	LinearSystemId_CreateDCMotorSystem.vi LinearSystemId_CreateDriveTrainVelocitySystem.vi LinearSystemId_CreateElevatorSystem.vi LinearSystemId_CreateFlywheelSystem.vi LinearSystemId_CreateSingleJointedArmSystem.vi LinearSystemId_DCMotor_Pack_Model_Params.vi	Function Prototype	Update to use create matrix Update to use create matrix Update to use create matrix	Code Rev	Test Prog	Error Ch
LINEAR SYSTEM ID	X X X X X X X X X X X X X X X X X X X		X X X X X X X X X X X X X X X X X X X	SI SI	LinearSystemId_CreateDCMotorSystem.vi LinearSystemId_CreateDriveTrainVelocitySystem.vi LinearSystemId_CreateElevatorSystem.vi LinearSystemId_CreateFlywheelSystem.vi LinearSystemId_CreateSingleJointedArmSystem.vi LinearSystemId_DCMotor_Pack_Model_Params.vi LinearSystemId_DiffDrv_ID_Pack_Model_Params.vi	Function Prototype	Update to use create matrix Update to use create matrix Update to use create matrix	Code Rev	Test Prog	Error Ch
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LINEAR SYSTEM ID	X X X X X X X X X X X X X X X X X X X		X X X X X X X X X X X X X X X X X X X	SI SI SI SI	LinearSystemId_CreateDCMotorSystem.vi LinearSystemId_CreateDriveTrainVelocitySystem.vi LinearSystemId_CreateElevatorSystem.vi LinearSystemId_CreateFlywheelSystem.vi LinearSystemId_CreateSingleJointedArmSystem.vi LinearSystemId_DCMotor_Pack_Model_Params.vi LinearSystemId_DiffDrv_ID_Pack_Model_Params.vi LinearSystemId_DiffDrv_Pack_Model_Params.vi LinearSystemId_DiffDrv_Pack_Model_Params.vi LinearSystemId_Elevator_Pack_Model_Params.vi	Function Prototype	Update to use create matrix Update to use create matrix Update to use create matrix	Code Rev	Test Prog	Error Ch
LINEAR SYSTEM ID	X		X	SI SI SI SI	LinearSystemId_CreateDCMotorSystem.vi LinearSystemId_CreateDriveTrainVelocitySystem.vi LinearSystemId_CreateElevatorSystem.vi LinearSystemId_CreateFlywheelSystem.vi LinearSystemId_CreateSingleJointedArmSystem.vi LinearSystemId_DCMotor_Pack_Model_Params.vi LinearSystemId_DiffDrv_ID_Pack_Model_Params.vi LinearSystemId_DiffDrv_Pack_Model_Params.vi LinearSystemId_Elevator_Pack_Model_Params.vi LinearSystemId_Elevator_Pack_Model_Params.vi LinearSystemId_FlyWheel_Pack_Model_Params.vi LinearSystemId_IdentifyDriveTrainSystem.vi	Function Prototype	Update to use create matrix Update to use create matrix Update to use create matrix	Code Rev	Test Prog	Error Ch
LINEAR SYSTEM ID	X X X X X X X X X X X X X X X X X X X		X	SI SI SI SI	LinearSystemId_CreateDCMotorSystem.vi LinearSystemId_CreateDriveTrainVelocitySystem.vi LinearSystemId_CreateElevatorSystem.vi LinearSystemId_CreateFlywheelSystem.vi LinearSystemId_CreateSingleJointedArmSystem.vi LinearSystemId_DCMotor_Pack_Model_Params.vi LinearSystemId_DiffDrv_ID_Pack_Model_Params.vi LinearSystemId_DiffDrv_Pack_Model_Params.vi LinearSystemId_Elevator_Pack_Model_Params.vi LinearSystemId_Elevator_Pack_Model_Params.vi LinearSystemId_FlyWheel_Pack_Model_Params.vi LinearSystemId_IdentifyDriveTrainSystem.vi LinearSystemId_IdentifyPositionSystem.vi	Function Prototype	Update to use create matrix	Code Rev	Test Prog	Error Ch
LINEAR SYSTEM ID	X		X X X X X X X X X X X X X X X X X X X	SI SI SI SI SI	LinearSystemId_CreateDCMotorSystem.vi LinearSystemId_CreateDriveTrainVelocitySystem.vi LinearSystemId_CreateElevatorSystem.vi LinearSystemId_CreateFlywheelSystem.vi LinearSystemId_CreateSingleJointedArmSystem.vi LinearSystemId_DCMotor_Pack_Model_Params.vi LinearSystemId_DiffDrv_ID_Pack_Model_Params.vi LinearSystemId_DiffDrv_Pack_Model_Params.vi LinearSystemId_Elevator_Pack_Model_Params.vi LinearSystemId_FlyWheel_Pack_Model_Params.vi LinearSystemId_IdentifyDriveTrainSystem.vi LinearSystemId_IdentifyDriveTrainSystem.vi LinearSystemId_IdentifyPositionSystem.vi	Function Prototype	Update to use create matrix	Code Rev	Test Prog	Error Ch
LINEAR SYSTEM ID	X		X X X X X X X X X X X X X X X X X X X	SI SI SI SI SI	LinearSystemId_CreateDCMotorSystem.vi LinearSystemId_CreateDriveTrainVelocitySystem.vi LinearSystemId_CreateElevatorSystem.vi LinearSystemId_CreateFlywheelSystem.vi LinearSystemId_CreateSingleJointedArmSystem.vi LinearSystemId_DCMotor_Pack_Model_Params.vi LinearSystemId_DiffDrv_ID_Pack_Model_Params.vi LinearSystemId_DiffDrv_Pack_Model_Params.vi LinearSystemId_Elevator_Pack_Model_Params.vi LinearSystemId_Elevator_Pack_Model_Params.vi LinearSystemId_FlyWheel_Pack_Model_Params.vi LinearSystemId_IdentifyDriveTrainSystem.vi LinearSystemId_IdentifyPositionSystem.vi	Function Prototype	Update to use create matrix	Code Rev	Test Prog	Error Ch
LINEAR SYSTEM ID	X		X X X X X X X X X X X X X X X X X X X	SI SI SI SI SI	LinearSystemId_CreateDCMotorSystem.vi LinearSystemId_CreateDriveTrainVelocitySystem.vi LinearSystemId_CreateElevatorSystem.vi LinearSystemId_CreateFlywheelSystem.vi LinearSystemId_CreateSingleJointedArmSystem.vi LinearSystemId_DCMotor_Pack_Model_Params.vi LinearSystemId_DiffDrv_ID_Pack_Model_Params.vi LinearSystemId_DiffDrv_Pack_Model_Params.vi LinearSystemId_Elevator_Pack_Model_Params.vi LinearSystemId_FlyWheel_Pack_Model_Params.vi LinearSystemId_IdentifyDriveTrainSystem.vi LinearSystemId_IdentifyDriveTrainSystem.vi LinearSystemId_IdentifyPositionSystem.vi	Function Prototype	Update to use create matrix	Code Rev	Test Prog	Error Ch
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STATE SPACE ESTIMATION

Revision 2025.0 1/7/2025 – Update april tag definitions, added new field. DiffDrivePoseEst ResetPosition.vi XX Χ DiffDrivePoseEst SetVisionMeasurementStdDevs.vi XX DiffDrivePoseEst Update.vi Χ Χ DiffDrivePoseEst UpdateWithTime.vi X DiffDrivePoseEst VisionCorrect Callback.vi XX X DiffDrivePoseEst VisionCorrect Kalman H Callback.vi Function Prototype Notes DIFFERENTIAL DRIVE POSE ESTIMATOR 2 X X X DiffDrivePoseEst2 AddVisionMeasurement.vi X X X NO SI DiffDrivePoseEst2 BufferDuration.vi DiffDrivePoseEst2 Execute.vi DiffDrivePoseEst2 GetEstimatedPosition.vi DiffDrivePoseEst2_InterpRecord_ExtractFromVar.vi XX No DiffDrivePoseEst2 InterpRecord Interp.vi DiffDrivePoseEst2 InterpRecord New.vi $X \mid X$ No SI DiffDrivePoseEst2 New.vi XX X X X X X DiffDrivePoseEst2 Pack Config.vi X X SI SI DiffDrivePoseEst2 ResetPosition.vi XX X SI DiffDrivePoseEst2 SetVisionMeasurementStdDevs.vi XX X DiffDrivePoseEst2 Update.vi DiffDrivePoseEst2_UpdateWithTime.vi $X \mid X$ X VI Name Function Prototype Notes EXTENDED KALMAN FILTER X X ExtendedKalmanFilter Correct OnlyUY.vi ExtendedKalmanFilter Correct.vi Just a shell, not functional! XX Χ ExtendedKalmanFilter GetP Single.vi ExtendedKalmanFilter GetP.vi XX Χ ExtendedKalmanFilter_GetXHat_Single.vi XX Χ X X ExtendedKalmanFilter GetXHat.vi Χ ExtendedKalmanFilter New.vi XX X ExtendedKalmanFilter Predict.vi XX Χ ExtendedKalmanFilter Reset.vi ExtendedKalmanFilter_SetP.vi $X \mid X$ X ExtendedKalmanFilter_SetXHat_Single.vi XX Χ ExtendedKalmanFilter SetXHat.vi ltem VI Name Function Prototype Notes KALMAN FILTER X X Χ Χ KalmanFilter Correct.vi XX Χ KalmanFilter GetK KalmanFilter GetK Single.vi $X \mid X$ Χ X X X X Χ KalmanFilter GetXHat X KalmanFilter_GetXHaT_Single XX Χ X KalmanFilter New.vi XX Χ X KalmanFilter Predict.vi KalmanFilter Reset.vi $X \mid X$ X KalmanFilter SetXHat XX Χ KalmanFilter SetXHat Single

Revision 2025.0 1/7/2025 – Update april tag definitions, added new field. Function Prototype KALMAN FILTER LATENCY COMPENSATOR X X KalmanFilterLatencyComp_AddObserverState.vi XX Χ KalmanFilterLatencyComp_ApplyPastGlobalMeas_FuncGroup.vi KalmanFilterLatencyComp_ApplyPastGlobalMeasurement_UKF.vi $X \mid X$ Χ KalmanFilterLatencyComp_FindClosestMeasurement.vi X X Χ X KalmanFilterLatencyComp New.vi KalmanFllterLatencyComp_Observer_New.vi XX KalmanFilterLatencyComp Reset.vi Function Prototype **MECANUM DRIVE POSE ESTIMATOR** MecaDrivePoseEst AddVisionMeasurement StdDev.vi MecaDrivePoseEst AddVisionMeasurement.vi X MecaDrivePoseEst GetEstimatedPosition.vi MecaDrivePoseEst Kalman F Callback.vi No XX No MecaDrivePoseEst Kalman H Callback.vi MecaDrivePoseEst New.vi $X \mid X$ Χ MecaDrivePoseEst ResetPosition.vi MecaDrivePoseEst SetVisionMeasurementStdDevs.vi XX Χ MecaDrivePoseEst Update.vi XX Χ MecaDrivePoseEst UpdateWithTime.vi MecaDrivePoseEst_VisionCorrect_Callback.vi No $X \mid X$ No MecaDrivePoseEst VisionCorrect Kalman H Callback.vi Function Prototype Notes MECANUM DRIVE POSE ESTIMATOR 2 X X X X NO SI MecaDrivePoseEst2 AddVisionMeasurement.vi MecaDrivePoseEst2 BufferDuration.vi X X X X MecaDrivePoseEst2 Execute.vi MecaDrivePoseEst2 GetEstimatedPosition.vi XX X SI X X X No SI MecaDrivePoseEst2 InterpRecord ExtractFromVar.vi No MecaDrivePoseEst2 InterpRecord Interp.vi MecaDrivePoseEst2_InterpRecord_New.vi XX No SI $X \mid X$ X MecaDrivePoseEst2 New.vi MecaDrivePoseEst2 Pack Config.vi X X X X SI X SI X SI MecaDrivePoseEst2 ResetPosition.vi XX MecaDrivePoseEst2 SetVisionMeasurementStdDevs.vi XX X MecaDrivePoseEst2 Update.vi MecaDrivePoseEst2_UpdateWithTime.vi Χ Function Prototype Notes SWERVE DRIVE POSE ESTIMATOR SwerveDrivePoseEst AddVisionMeasurement StdDev.vi XX Χ SwerveDrivePoseEst AddVisionMeasurement.vi SwerveDrivePoseEst_GetEstimatedPosition.vi $X \mid X$ Χ SwerveDrivePoseEst Kalman F Callback.vi X X Χ SwerveDrivePoseEst Kalman H Callback.vi

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SwerveDrivePoseEst New.vi

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WPILib LabVIEW Math Library - VI Implementation List Revision 2025.0 1/7/2025 – Update april tag definitions, added new field. SwerveDrivePoseEst ResetPosition.vi SwerveDrivePoseEst_SetVisionMeasurementStdDevs.vi $X \mid X$ Χ X X X SwerveDrivePoseEst Update.vi SwerveDrivePoseEst UpdateWithTime.vi XX Χ SwerveDrivePoseEst_VisionCorrect_Callback.vi XX X SwerveDrivePoseEst VisionCorrect Kalman H Callback.vi Function Prototype Notes SWERVE DRIVE POSE ESTIMATOR 2 X X SwerveDrivePoseEst2_AddVisionMeasurement.vi X X X X No X X X X X No SI SwerveDrivePoseEst2 BufferDuration.vi SwerveDrivePoseEst2 Execute.vi X X X SI SwerveDrivePoseEst2 GetEstimatedPosition.vi SwerveDrivePoseEst2 InterpRecord ExtractFromVar.vi X X X No SI SwerveDrivePoseEst2_InterpRecord_Interp.vi XX No SwerveDrivePoseEst2_InterpRecord_New.vi No SI XX X SwerveDrivePoseEst2 New.vi X X X X SI SwerveDrivePoseEst2 Pack Config.vi SwerveDrivePoseEst2 ResetPosition.vi XX X SI X X X X SwerveDrivePoseEst2 SetVisionMeasurementStdDevs.vi X SI X SwerveDrivePoseEst2 Update.vi XX Χ SwerveDrivePoseEst2 UpdateWithTime.vi Function Prototype Notes UNSCENTED KALMAN FILTER X X UnscentedKalmanFilter Correct FuncGroup.vi Χ UnscentedKalmanFilter Correct OnlyUY.vi UnscentedKalmanFilter_Correct_OnlyUYR.vi XX Χ UnscentedKalmanFilter Correct.vi XX Χ UnscentedKalmanFilter GetP Single.vi UnscentedKalmanFilter GetP.vi $X \mid X$ Χ UnscentedKalmanFilter_GetXHat_Single.vi XX X UnscentedKalmanFilter GetXHat.vi XX Χ UnscentedKalmanFilter_New_Default.vi XX X UnscentedKalmanFilter New FuncGroup.vi UnscentedKalmanFilter New.vi $X \mid X$ Χ XX Χ UnscentedKalmanFilter Predict.vi XX X UnscentedKalmanFilter Reset.vi X UnscentedKalmanFilter SetP.vi XX Χ UnscentedKalmanFilter SetXHat Single.vi XX Χ UnscentedKalmanFilter SetXHat.vi UnscentedKalmanFilter_Transform.vi XX Χ '======== STATE SPACE CONTROL '======== Function Prototype Notes CONTROL AFFINE PLANT INVERSION FEEDFORWARD

WPILib LabVIEW Math Library – VI Implementation List Revision 2025.0 1/7/2025 – Update april tag definitions, added new field. Function Prototype Notes DIFFERENTIAL DRIVE ACCELERATION LIMITER X X X X X X X DiffDrvAccelLimit Calculate.vi DiffDrvAccelLimit New.vi Function Prototype Notes IMPLICIT MODEL FOLLOWER X X Χ ImplModelFollow Calculate.vi ImplModelFollow_GetU.vi X X X X X X Χ Χ X X X X ImplModelFollow_GetU_Single.vi ImplModelFollow_New.vi XX X ImplModelFollow New Plant.vi ImplModelFollow Reset.vi XX Χ X Menu Item Function Prototype Notes LINEAR PLANT INVERSION FEEDFORWARD X X X X X X LinearPIntInvFF_Calculate_NextR.vi LinearPIntInvFF_Calculate.vi XX LinearPIntInvFF_GetR_Single.vi LinearPIntInvFF_GetR.vi Χ XX X XX LinearPIntInvFF_GetUff_Single.vi Χ Χ LinearPIntInvFF GetUff.vi X LinearPIntInvFF New Plant.vi XX LinearPIntInvFF New.vi LinearPIntInvFF_Reset_Initial.vi XX Χ LinearPIntInvFF_Reset_Zero.vi $X \mid X$ Χ

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Revision 2025.0 1/7/2025 – Update april tag definitions, added new field.

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Revision 2025.0 1/7/2025 – Update april tag definitions, added new field. Function Prototype LTV DIFFERENTIAL DRIVE CONTROLLER X X X LTVDiffDriveCtrl AtReference.vi SI XX X LTVDiffDriveCtrl Calculate TrajState.vi LTVDiffDriveCtrl Calculate.vi $X \mid X$ X LTVDiffDriveCtrl_Execute_TrajState.vi LTVDiffDriveCtrl Execute.vi LTVDiffDriveCtrl New.vi X X X X SI LTVDiffDriveCtrl_Pack_Ctrl_Params.vi X X X X SI LTVDiffDriveCtrl_Pack_Model_Params.vi X X X X SI X X X X SI LTVDiffDriveCtrl_Pack_Tolerance.vi LTVDiffDriveCtrl SetTolerance.vi Function Prototype Notes LTV UNICYCLE CONTROLLER X X X SI X LTVUnicycleCtrl_AtReference.vi LTVUnicycleCtrl_Calculate_TrajState.vi $X \mid X$ X X XX Χ LTVUnicycleCtrl Calculate.vi X X X X X X X X LTVUnicycleCtrl Execute.vi LTVUnicycleCtrl_Execute_TrajState.vi XX X LTVUnicycleCtrl_New.vi LTVUnicycleCtrl_Pack_Model_Params.vi X X X X SI LTVUnicycleCtrl_Pack_Tolerance.vi X X X X SI X SI X X SI X LTVUnicycleCtrl_SetEnabled.vi XX LTVUnicycleCtrl_SetTolerance.vi '======== STATE SPACE UTILITIES '======== Function Prototype Notes CALLBACK HELPER X X X X CallbackHelp MatrixMinus.vi CallbackHelp_MatrixMult_CoerceSizeB.vi X X X X $X \mid X \mid X \mid X$ CallbackHelp MatrixMult.vi CallbackHelp MatrixPlus.vi Function Prototype Notes DISCRETIZATION X X X Χ Discretization DiscretizeA.vi Discretization DiscretizeAB.vi $X \mid X$ X X XX Discretization DiscretizeABTaylor.vi Χ Χ XX X X Discretization DiscretizeAQ.vi X XX Discretization DiscretizeAQTaylor.vi X XX Χ Discretization DiscretizeR.vi

WPILib LabVIEW Math Library - VI Implementation List Revision 2025.0 1/7/2025 – Update april tag definitions, added new field. Function Prototype Notes STATE SPACE UTIL X X X No StateSpaceUtil Check Stabalizable.vi Internal routine XX Χ StateSpaceUtil ClampInputMaxMagnitude.vi Routine exists, it is just a shell StateSpaceUtil IsDetectable.vi $X \mid X$ X XX StateSpaceUtil_IsStabalizable.vi Χ X StateSpaceUtil MakeCostMatrix.vi StateSpaceUtil_MakeCovarianceMatrix.vi XX Χ StateSpaceUtil MakeWhiteNoiseVector.vi StateSpaceUtil_NomalizeInputVector.vi XX Χ StateSpaceUtil PoseTo3dVector.vi XX Χ StateSpaceUtil PoseTo4dVector.vi X StateSpaceUtil_PoseToVector.vi SIMULATION '======== Function Prototype Notes BATTERY SIM X X Χ SI BatterySim CalculateDefaultBatteryLoadedVoltage.vi BatterySim_CalculateLoadedVoltage.vi X SI $X \mid X$ BatterySim Execute.vi X X X X SI VI Name Function Prototype Notes DC MOTOR SIM X X DCMotorSim Execute.vi $X \mid X$ DCMotorSim getAngularPositionRad.vi X X Χ DCMotorSim_getAngularPositionRotations.vi XX X DCMotorSim_getAngularVelocityRadPerSec.vi DCMotorSim_getAngularVelocityRPM.vi $X \mid X$ X DCMotorSim GetCurrentDrawAmps.vi Χ X DCMotorSim New MOI.vi XX DCMotorSim New Plant.vi X X X X SI DCMotorSim_Pack_Simulation_Params.vi $X \mid X$ Χ DCMotorSim_SetInputVoltage.vi DCMotorSim Update.vi VI Name Function Prototype Notes DIFFERENTIAL DRIVE TRAIN SIM X X DiffDriveTrainSim_ClampInput.vi XX Χ DiffDriveTrainSim_CreateKitbotSim_EstMass.vi DiffDriveTrainSim CreateKitbotSim EstMassMOI.vi XX X DiffDriveTrainSim_CreateKitbotSim.vi $X \mid X$ Χ X X X X DiffDriveTrainSim Execute.vi

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DiffDriveTrainSim GetDynamics.vi

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WPILib LabVIEW Math Library – VI Implementation List Revision 2025.0 1/7/2025 – Update april tag definitions, added n

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WPILib LabVIEW Math Library – VI Implementation List Revision 2025.0 1/7/2025 – Update april tag definitions, added new field. Function Prototype Notes LINEAR SYSTEM SIM X X LinearSystemSim ClampInput.vi LinearSystemSim_Execute.vi X X X LinearSystemSim GetCurrentDrawAmps.vi DONT IMPLEMENT XX LinearSystemSim_GetOutput_Single.vi XX Χ LinearSystemSim_GetOutput.vi LinearSystemSim_New XX X LinearSystemSim_New_NoNoise.vi X X X X LinearSystemSim SetInput Array.vi Doesn't use clamp? X LinearSystemSim_SetInput_Single.vi XX Χ LinearSystemSim_SetInput.vi XX X LinearSystemSim Setstate.vi LinearSystemSim Update.vi $X \mid X$ X No LinearSystemSim_UpdateX.vi XX X X X No LinearSystemSim_UpdateY.vi Function Prototype SINGLE JOINT ARM SIM X X SngJntArmSim_EsitmateMOI.vi X X X X SngJntArmSim_Execute.vi SngJntArmSim_GetAngleRads.vi $X \mid X$ X SngJntArmSim_GetCurrentDraw.vi XX Χ X X SngJntArmSim_GetVelocityRadsPerSec.vi Χ SngJntArmSim HasHitLowerLimit.vi Χ XX Χ SngJntArmSim HasHitUpperLimit.vi XX X SngJntArmSim New.vi X X X X SI SngJntArmSim_Pack_Simulation_Params.vi XX SngJntArmSim_Rkf45_Func.vi No X SngJntArmSim SetInputVoltage.vi SngJntArmSim SetState.vi X XX Χ SngJntArmSim_Update.vi XX Χ SngJntArmSim UpdateX.vi SngJntArmSim_WouldHitLowerLimit.vi $X \mid X$ Χ SngJntArmSim WouldHitUpperLimit.vi XX Χ '========

'======= MATRIX UTILITIES

> Function Prototype Notes MAT BUILDER X X X SI MatBuilder Create.vi XX X SI MatBuilder Fill.vi

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WPILib LabVIEW Math Library – VI Implementation List Revision 2025.0 1/7/2025 – Update april tag definitions, added new field. Menu Item Function Prototype Notes X SI X SI XX MATRIX Matrix AssignBlock.vi XX Matrix Block.vi Matrix ChangeBoundsUnchecked.vi Matrix_Create.vi XX X SI Matrix Det.vi Matrix_Diag.vi XX X SI Matrix_Div_Scalar.vi
Matrix_ElementPower.vi labview has function XX Matrix ElementSum.vi X SI Matrix ElementTimes.vi Matrix_Equals.vi $X \mid X$ X I Matrix_Exp.vi Matrix_ExtractColumnVector.vi X SI $X \mid X$ XX X SI Matrix ExtractFrom.vi Matrix_ExtractMatrix.vi XX X SI Matrix ExtractRowVector.vi XX X SI Matrix Fill.vi Matrix_Get.vi labview has function Matrix Ident.vi WPILIB calls this EYE Matrix Inv.vi XX X SI Matrix IsEqual.vi Matrix_IsIdentical.vi Matrix_LLTDecompose.vi XX X I Matrix Max.vi Matrix_MaxAbs.vi Matrix Mean.vi Matrix_MinInternal.vi Matrix Minus Matrix.vi Matrix Minus Scalar.vi XX X I Matrix NormF.vi Matrix NormIndP1.vi Matrix_Plus_Matrix.vi Matrix Plus Scalar.vi HIS NEEDS WORK!!!! Matrix Pow.vi XX X SI Matrix SetColumn.vi THERE ARE LOTS OF OTHER MATRIX FUNCTIONS THAT X SI Matrix_SetRow.vi SHOULD BE INCLUDED HERE FOR ISOLATION. Matrix Solve.vi Matrix Times Matrix.vi Matrix_Times_Scalar.vi Matrix Trace.vi X SI Matrix Transpose.vi X X X X Matrix WithinTolerance.vi

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Function Prototype

NOTE Matrix also has an

parameters.... YUK.

ExtractMatrix with different calling

S VI Name

SI

SimpleMatrix ExtractMatrix.vi

SIMPLE MATRIX X

WPILib LabVIEW Math Library - VI Implementation List Revision 2025.0 1/7/2025 – Update april tag definitions, added new field. Function Prototype Notes MatrixHelper_CooerceSize.vi MatrixHelper_MultCooerceBSize.vi MatrixHelper Zero.vi VI Name Function Prototype Notes VECTOR BUILDER X X X SI X SI X SI VecBuilder_1x1Fill.vi X X X X VecBuilder_2x1Fill.vi VecBuilder_3x1Fill.vi X SI X SI XX VecBuilder 4x1Fill.vi VecBuilder 5x1Fill.vi XX XX X SI VecBuilder_6x1Fill.vi X X X X X SI X SI VecBuilder 7x1Fill.vi VecBuilder 8x1Fill.vi VecBuilder_9x1Fill.vi VecBuilder_10x1Fill.vi VecBuilder_ArrayBy1Fill.vi X X X X SI VI Name Function Prototype Notes $\begin{array}{c|c} \hline X & S_i \\ \hline X & S_i \\ \hline \end{array}$ Vector Dot.vi XX Vector Norm.vi '======== MATH '======== Function Prototype Notes AngleStats_AngleAdd_CallbackHelp.vi
AngleStats_AngleAdd.vi
AngleStats_AngleMean_CallbackHelp.vi
AngleStats_AngleMean.vi ANGLE STATISTICS X X X X X XX X I X X X X X X AngleStats_AngleResidual_CallbackHelp.vi X I X AngleStats AngleResidual.vi

Function Prototype

Notes

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MathUtil_AngleModulus.vi

MATH UTILITY X X

X SI

Library – Vi implementation Lis									-				
 Update april tag definitions, added 	new	ileid.						he array at 18 at 18					
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	X			X				MathUtil_RateOfChange.vi					
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	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
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	X		†	X	SI			MerweScSigPts_GetNumSigmas.vi					
	X	X	_	X	SI	\rightarrow		MerweScSigPts_GetWc_Single.vi		+			
			-	X	SI	\longrightarrow		MerweScSigPts GetWc.vi		+			
	X	X	₩		31	\longrightarrow							
	X	X	-	X	SI	\longrightarrow		MerweScSigPts_GetWm_Single.vi		+			
	X	X	<u> </u>	X	SI			MerweScSigPts_GetWm.vi					
	X		<u> </u>	X	1			MerweScSigPts_New_Default.vi					
	X	Χ		X	1			MerweScSigPts_New.vi					
	X	X		X	1	_ 7		MerweScSigPts_SigmaPoints.vi					
					$\overline{}$								
NUMERICAL INTEGRATION	X Implemented	X Documente	Not WPILIE	X Menu Item	- Execution	Test Routine		VI Name NumIntegrate_Func_Ax_Bu_K.vi		Notes NOT USED. Should this be used	Code Reviel	Test Program	Error Ch
										or abandoned???			
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	X	X		X				NumIntegrate_Rk4_Dbl_X.vi					
	X	X		X				NumIntegrate_Rk4_Mat_X_U.vi					
	X	X		X				NumIntegrate_Rk4_Mat_X.vi					
	X	X		No	SI			NumIntegrate_Rkdp_Func_A.vi					
	X	X		No	SI	-		NumIntegrate_Rkdp_Func_B1.vi					
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	X	X	↓	X		\longrightarrow		NumIntegrate_RKDP_Mat_X_U.vi		New replacement for RKF45			
	X	X	<u> </u>	No	SI		$\perp \perp \perp \mid$	NumIntegrate_Rkf45_Func_A.vi					
	Χ	X	<u> </u>	No	SI		+	NumIntegrate_Rkf45_Func_B1.vi					
	Χ		<u> </u>	No	SI		'لــــــــــــــــــــــــــــــــــــ	NumIntegrate_Rkf45_Func_B1B2.vi					
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			<u> </u>				\vdash	hi i i pigg 5		functions.			
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	~	X	-	No	1	\longrightarrow	\vdash	NumIntegrate_Rkf45_Impl.vi		functions.			
	X		-	X		\longrightarrow		NumIntegrate_Rkf45_Impi.vi NumIntegrate_Rkf45_Mat_X_U.vi	<u> </u>	Note that this Feinberg method has			
				^						been changed and a Dormand Price method has been implemented TODO			
			4					NumIntegrate_RKf45_New.vi		Removed. Never used.			
	X	X	X	X	SI			NumIntegrate_Trap_Dbl.vi					
	X	X	X	X	1			NumIntegrate_Trap_Mat.vi					
	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program		1		Code Review	Test Program	Error Checking
	ō	õ	¥	ž	ec	St	du	VI Name	Function Prototype		ge	st	Ģ

Revision 2025.0 1/7/2025 – Update april tag definitions, added new field.

RUNGE KUTTA TIME VARYING X X RungeKuttaTimeVarying_RK4_Mat_T_Y.vi No VI Name Function Prototype Notes NUMERICAL JACOBIAN X NumJacobian_U.vi X X NumJacobian X.vi Function Prototype Notes RICCATI X X X Riccati Check Detectable.vi Routine exists, it is just a shell XX Riccati Check Stabilizable.vi Not really done !!! Riccati_DARE_Choose.vi Intended to allow DARE method testing. Riccati DARE Iterate.vi $X \mid X \mid X \mid X$ Riccati_DARE_StructDoubling.vi $X \mid X \mid X \mid X$ Χ X Riccati_DARE_N.vi Riccati DARE.vi XX X Riccati_Input_Check.vi '======= VISION '======= Function Prototype COMPUTER VISION UTILITIES X X Χ CompVisionUtil_CalculateDistanceToTarget.vi X X X X Χ CompVisionUtil_EstimateCameraToTarget.vi CompVisionUtil_EstimateFieldToCamera.vi Χ X X X X X CompVisionUtil EstimateFieldToRobot.vi CompVisionUtil_EstimateFieldToRobot_Alt.vi $\frac{X}{X}$ XX CompVisionUtil_ObjectToRobotPose.vi Function Prototype Notes APRIL TAG X X X SI AprilTag_Equals.vi | X | X | X | X | SI | X | X | SI | AprilTag_GetAll.vi AprilTag_New.vi Function Prototype Notes APRIL TAG FIELD LAYOUT X X X SI AprilTagFieldLayout_GetField.vi

Revision 2025.0 1/7/2025 – Update april tag definitions, added new field. AprilTagFieldLayout_GetOriginPosition.vi XX X SI AprilTagFieldLayout_GetTagPose.vi XX X SI | X | SI | X | SI | X | SI | X X X X AprilTagFieldLayout_GetTags.vi AprilTagFieldLayout New.vi XX AprilTagFieldLayout_New2022.vi AprilTagFieldLayout_New2023.vi XX X SI X SI AprilTagFieldLayout_New2024.vi $X \mid X$ X X X X X SI X no AprilTagFieldLayout_New2025.vi AprilTagFieldLayout_NewSelect.vi polymorphic VI no SI XX AprilTagFieldLayout_NewSelect_OLD AprilTagFieldLayout SetOrigin.vi XX X SI AprilTagFieldLayout_SetOrigin_Position.vi X SI Function Prototype Notes APRIL TAG POSE ESTIMATE X X AprilTagPoseEstimate_GetAll.vi X SI XX X SI AprilTagPoseEstimate GetAmbiguity.vi AprilTagPoseEstimate New.vi XX X SI Notes VI Name Function Prototype FIELD DISPLAY X X X X FieldDisp_Element_Disp.vi X X X X X FieldDisp_Element_Prepare.vi X no X FieldDisp Element Rotate.vi FieldDisp_Element_Rotate_Init.vi X no FieldDisp_Field_Crop_and_Scale.vi X no X X X X X X X X X FieldDisp Field Disp.vi X FieldDisp_Field_Selector_Prepare.vi X X no FieldDisp Get Field Info.vi FieldDisp_Open_Field_Info_File.vi X no X no FieldDisp_Read_Field_Pic.vi FieldDisp Read Image File.vi '======== COMMUNICATIONS '======== NETMOKK MOT WPILIB

X X Not WPILIB

Y X X Menu Item VI Name Function Prototype Notes NetworkUDP Close.vi X X X X I NetworkUDP Receive.vi NetworkUDP Send.vi $X \mid X \mid X \mid X \mid I \mid$ VI Name Function Prototype Notes NT Client NoDS.vi

Revision 2025.0 1/7/2025 – Update april tag definitions, added new field.

aca II	d new field.												
	X	X		X		NT IsConnected.vi							

'======== TYPE DEFINITIONS Routine ltem Function Prototype VI Name Notes TypeDef Z Z X X N/A AprilTag.ctl Z Z X X N/A Z Z X X N/A AprilTagFieldLayout,ctl AprilTagFieldLayoutOriginPosition_ENUM.ctl Z Z X X N/A AprilTagFields ENUM.ctl $Z \mid Z \mid X \mid X \mid N/A \mid$ AprilTagPoseEstimate.ctl ARM FF.CTL Z Z X X N/A Z Z X X N/A BANG BANG.CTL BICon-Matrix FUNC TYPE.CTL NOT USED. Should this be $X \mid X \mid N/A$ deleted or abandoned??? Z Z X X N/A Z Z X X N/A CALLBACK FUNC TYPE.CTL CHASSIS SPEEDS.CTL Z Z X X N/A CONTRAINED STATE.CTL Z Z X X N/A COORDINATE AXIS.CTL COORDINATE_SYSTEM.CTL Z Z X X N/A Z Z X X N/A DCMOTOR SIM.CTL OBSOLETE - Removed Z Z Z X N/A DCMOTOR SIM SIMULATION PARAMS.CTL $Z \mid Z \mid X \mid X \mid N/A \mid$ DCMOTOR TYPES ENUM.CTL DCMOTOR.CTL Z Z X X N/A DEBOUNCER_TYPE_ENUM.Ctl Z Z X X N/A Z Z X X N/A DEBOUNCER.CTL Z Z X X N/A DIFF DRIVE ACCEL LIMIT.CTL DIFF DRIVE KINEMATICS.CTL $Z \mid Z \mid X \mid X \mid N/A \mid$ DIFF DRIVE Kitbot WheelSize ENUM.ctl Z Z X X N/A Z Z X X N/A Z Z X X N/A DIFF_DRIVE_ODOM2.ctl DIFF DRIVE Pose EST.ctl Z Z X X N/A DIFF DRIVE POSE EST2.ctl DIFF_DRIVE_POSE_EST2_CONFIG.CTL Z Z X X N/A Z Z X No N/A DIFF_DRIVE_POSE_EST2_INTERP_RECORD.CTL DIFF DRIVE ToughBoxMini GearChoice ENUM.ctl Z Z X X N/A DIFF DRIVE ToughBoxMini MotorChoice ENUM.ctl Z Z X X N/A Z Z X N/A DIFF DRIVE SIM MODEL PARAMS Z X N/A DIFF DRIVE SIM SIMULATION PARAMS.CTL DIFF DRIVE TRAIN SIM STATE ENUM.CTL $Z \mid Z \mid X \mid X \mid N/A \mid$ Z Z X X N/A DIFF DRIVE TRAIN SIM.ctl
 Z
 Z
 X
 X
 NA

 Z
 Z
 X
 X
 NA
 Was UTIL WAYPOINT.VI DISPLAY WAYPOINT.ctl DISPLAY WEIGHTED WAYPOINT.ctl New V1.5. was UTIL_WEIGHTED_WAYPOINIT.VI DrumSequence_State_ENUM.vi NA Z X NA DrumSequence Step ENUM.vi Z Z X X N/A Z Z X X N/A ELEV FF.CTL ELEVATOR_SIM.CTL Z Z Z X N/A ELEVATOR SIM SIMULATION PARAMS.CTL Z Z X X N/A EXTENDED KALMAN CORRECT FUNC GROUP.CTL Z X N/A EXTENDED KALMAN FILTER.CTL Z X N/A Z N/A Z N/A FieldDisp ElementPicture.ctl FieldDisp FieldElement.ctl Ζ FieldDisp Field Info.ctl Z Z X X N/A FLYWHEEL SIM.ctl FLYWHEEL_SIM_SIMULATION PARAMS.CTL Z Z X N/A

Z Z X X N/A Z Z X X N/A

Z Z X X N/A

Z Z X X N/A

Z Z X X N/A Z Z X X N/A FUNCTION_GENERATOR_MATRIX.ctl
FUNCTION_GENERATOR.ctl

KALMAN FILTER LATENCY COMP.CTL

KALMAN FILTER LATENCY COMP FUNC GROUP.CTL

HOLONOMIC DRV CTRL.CTL

KALMAN FILTER.ctl

New 1/26/21

ed new f	ield					_
Z	Z	X	X	Ν/Δ	LINEAR FILTER.CTL	
Z	Z	X			LINEAR PLANT INV FF.ctl	
Z	Z	X			LINEAR QUADRATIC REGULATOR.ctl	
Z	Z	Z			LINEAR_SYSTEM_ID_DCMOTOR_MODEL.CTL	
Z		Z		N/A	LINEAR SYSTEM ID ELEVATOR MODEL.CTL	
Z		Z		N/A	LINEAR SYSTEM ID FLYWHEEL MODEL.CTL	
				N/A	LINEAR SYSTEM ID SINGLE JOINT ARM MODEL.CTL	
Z	7	Z		N/A		
Z	Z	X	_		LINEAR_SYSTEM_LOOP.ctl	
Z	Z	Z			LINEAR_SYSTEM_LOOP_CTRL_PARAMS.CTL	
Z	Z	Z		N/A	LINEAR_SYSTEM_LOOP_DCMOTOR_CTRL_PARAMS.CL	
Z	Z	Z		N/A	LINEAR_SYSTEM_LOOP_DIFF_DRV_CTRL_PARAMS.CTL	
Z	Z	Z			LINEAR_SYSTEM_LOOP_ELEVATOR_CTRL_PARAMS.CTL	
Z	Z	Z	_	N/A	LINEAR_SYSTEM_LOOP_FLYWHEEL_CTRL_PARAMS.CTL	
Z	Z	Z	_		LINEAR_SYSTEM_LOOP_SNGJNTARM_CTRL_PARAMS.CTL	
Z	Z	X		N/A	LINEAR_SYSTEM_SIM.ctl	
Z	Z	X		N/A	LINEAR_SYSTEM.ctl	
Z	Z	Z			LTV_DIFF_DRIVE_CTRL_CONTROL_PARAMS.CTL	
Z	Z	Z		N/A	LTV_DIFF_DRIVE_CTRL_MODEL_PARAMS.CTL	
Z	Z	X			LTV_DIFF_DRIVE_CTRL_STATE_ENUM.ctl	
Z	Z	Z			LTV_DIFF_DRIVE_CTRL_TOLERANCE.CTL	
Z	Z	X		N/A	LTV_DIFF_DRIVE_CTRL.ctl	
Z	Z	Z			LTV_UNICYCLE_CONTROLLER_MODEL_PARAMS.CTL	
Z	Z	X		N/A	LTV_UNICYCLE_CONTROLLER_STATE_ENUM.ctl	
Z	Z	Z		N/A	LTV_UNICYCLE_CONTROLLER_TOLERANCE.CTL	
Z	Z	X			LTV_UNICYCLE_CONTROLLER.CTL	
Z	Z	X		N/A	MECA_DRIVE_KINEMATICS.CTL	
Z	Z	X			MECA_DRIVE_ODOMETRY.CTL	
Z	Ζ	Χ		N/A	MECA_DRIVE_POSE_EST.CTL	
Z	Z	X		N/A	MECA_DRIVE_POSE_EST2.ctl	
Z	Ζ	X			MECA_DRIVE_POSE_EST2_CONFIG.CTL	
Z	_	Χ		N/A	MECA_DRIVE_POSE_EST2_INTERP_RECORD.CTL	
Z	Z	X			MECA_WHEEL_POSITIONS.CTL	
Z	Z	Χ			MECA_WHEEL_SPEEDS.CTL	
Z	Ζ	Χ	_		MEDIAN_FILTER.CTL	
Z	Z	X			MERWE_SCALED_SIGMA_PTS.ctl	
Z	Ζ	Χ			OBSERVER_SNAP_LIST_ITEM.CTL	
Z	Z	X			OBSERVER_SNAPSHOT.CTL	
Z	Z	X		N/A	PARAM_STACK_ITEM.CTL	
Z	Z	X			PARAM_STACK.CTL	
Z	Z	X			PID_ADV_LIMITS.CTL	
Z	Z	X	_		PID_ADV_TUNING.CTL	
Z	Z	X			PID_CONTROLLER.CTL	
Z	Z	X		N/A	PID_ERROR_TOLERANCE.CTL	
Z	Z	X			PID_INPUT_LIMITS.CTL	
Z	Z	X		N/A	PID_TUNING.CTL	
Z			X		POSE2D.CTL	
Z	Z		X		POSE3D.CTL	
Z	Z	X			POSEwCURVATURE.CTL	
Z	Z	X			PROFILED_PID_CONTROLLER.CTL	
Z	Z	X			QUATERNION.CTL	
<u>Z</u>	Z		X		RAMSETE_EXE_TUNING.CTL	
Z	Z	X			RAMSETE.CTL	
Z	Z	X			ROTATION2D.CTL	
Z	Z	X		N/A	ROTATION3D.CTL	
Z	Z	Z			SIMPLE_MOTOR_FF_KA_TUNE_PARAMS.CTL	
Z	Z	X	_		SIMPLE_MOTOR_FF.CTL	
Z	Z	X			SINGLE_JOINT_ARM_SIM.CTL	
Z	Z	X			SINGLE_JOINT_ARM_SIM_SIMULATION_PARAMS.CTL	
Z	Z	X		N/A	SLEW_RATE_LIMITER.CTL	
Z	Z	X		N/A	SPLINE_CTRL_VECTOR.CTL	
Z	Z	X		N/A	SPLINE.CTL	
Z	Z	X			SWERVE_DRIVE_KINEMATICS.CTL	
Z	Z	X	_		SWERVE_DRIVE_MODULE_POSITION.CTL	
Z	Z	X			SWERVE_DRIVE_ODOMETRY_CTL	
Z	Z	X			SWERVE_DRIVE_ODOMETRY.CTL	
Z 7	Ζ	X			SWERVE_DRIVE_POSE_EST.CTL	
Z	7	X			SWERVE_DRIVE_POSE_EST2.CONEIC.CTI	
Z	Z	X	X No		SWERVE_DRIVE_POSE_EST2_CONFIG.CTL SWERVE DRIVE POSE EST2 INTERP RECORD.CTL	
Z	Z		X		TIME INTERPOLATABLE BOOLEAN.CTL	
Z	Z		X		TIME_INTERPOLATABLE_BOOLEAN.CTL TIME INTERPOLATABLE DOUBLE.CTL	
		_ ^	_ ^	IV/H		

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WPILib LabVIEW Math Library – VI Implementation List Revision 2025.0 1/7/2025 – Update april tag definitions, added n

d new	field.					
Z	Z	Χ	X	N/A	TIME_INTERPOLATABLE_POSE2D.CTL	
Ζ	Z	Χ	Χ	N/A	TIME_INTERPOLATABLE_ROTATION2D.CTL	
Z	Z	Ζ	Χ	N/A	TIME INTERPOLATABLE VARIANT.CTL	
Z	Z	Χ	X	N/A	TIMER.CTL	
Z	Z	Χ	Χ	N/A	TRAJ CONFIG.CTL	
Ζ	Z	Χ	Χ	N/A	TRAJ CONSTRAINT CENTRIPETAL ACCEL.CTL	
Z	Z	Χ	Χ	N/A	TRAJ CONSTRAINT DIIF DRIVE KINEMATICS.CTL	
Z	Z	Χ	X	N/A	TRAJ CONSTRAINT DIIF DRIVE VOLTAGE.CTL	
Z	Z	Χ	X	N/A	TRAJ CONSTRAINT ELLIP REGION.CTL	
1		Χ		N/A	TRAJ CONSTRAINT JERK.CTL	Routine exists, it is just a shell
Ζ	Z	Χ	Χ	N/A	TRAJ CONSTRAINT MAX VELOCITY.CTL	
Z	Z	Χ	X	N/A	TRAJ CONSTRAINT MECA DRIVE KINEMATICS.CTL	
Z	Z	Χ	X	N/A	TRAJ CONSTRAINT MINMAX.CTL	
Z	Z	Χ	X	N/A	TRAJ CONSTRAINT RECT REGION.CTL	
Z	Z	Χ	Х	N/A	TRAJ CONSTRAINT SWERVE DRIVE KINEMATICS.CTL	
Z	Z	Χ	Х	N/A	TRAJ STATE.CTL	
Z	Z	X	X	N/A	TRAJECTORY SPLINE TYPE ENUM.CTL	
Z	Z	Χ	Х	N/A	TRAJECTORY.CTL	
Z	Z	Χ	Χ	N/A	TRANSFORM2D.CTL	
Ζ	Z	Χ	Χ	N/A	TRANSFORM3D.CTL	
Z	Z	Χ	X	N/A	TRANSLATION2D.CTL	
Z	Z	Χ	X	N/A	TRANSLATION3D.CTL	
Z	Z	Χ	Х	N/A	TRAPEZOID PROFILE CONSTRAINT.CTL	
Z	Z	X	X	N/A	TRAPEZOID PROFILE STATE.CTL	
Z	Z	Χ	Χ	N/A	TRAPEZOID PROFILE.CTL	
Z	Z	X	X	N/A	TWIST2D.CTL	
Z	Z	Χ	X	N/A	TWIST3D.CTL	
Z	Z	Χ	Χ	N/A	UNSCENTED KALMAN CORRECT FUNC GROUP.CTL	
Z	Z	Χ	Χ	N/A	UNSCENTED KALMAN FILTER.ctl	
Z	Z	Χ	Χ	N/A	UNSCENTED KALMAN NEW FUNC GROUP.CTL	
Z	Z	Χ	Х	N/A	UTIL PATHFINDER CONFIG.CTL	
N/A		N/A		N/A	WAYPOINTS.CTL	Delete – obsolete
Ζ	Ζ	Χ	Χ	NA	WEIGHTED WAYPOINT.CTL	New V1.5
N/A		N/A		N/A	X Y HEADINGS.CTL	Delete – obsolete
Z	Ζ	Χ	Х	N/A	X_Y_PAIR.CTL	
					· · · · · · · · · · · · · · · · · · ·	

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