

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...

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program
VI / CTL Totals	1273	1214	431	1198	745	49	12
VI Total (X)	1123	1089					
CTL Total (Z)	150	125					
VI Shell Total (I)	4						
CTRL Shell Total (I)	2						

Doc completed Pct
95.37%
Optimization Pct
58.52%

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

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BASE

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Category	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
ANALOG DELAY	X	X	X	X	I			AnalogDelay_Execute.vi		Similar to interpolated tree map..			
BUMPLESS TRANSFER	X	X	X	X	I			BumplessTransfer_Execute.vi					
FUNCTION GENERATOR	X	X		X	I			FunctionGenerator_Add_Value.vi		Similar to interpolated tree map..			
	X	X		X	I			FunctionGenerator_Add_XY.vi		Similar to interpolated tree map..			
	X	X		X	I			FunctionGenerator_Calculate.vi		Similar to interpolated tree map..			
	X	X		X	SI			FunctionGenerator_Clear.vi					
	X	X	X	X	I			FunctionGenerator_Execute.vi		Similar to interpolated tree map..			
	X	X		X	SI			FunctionGenerator_New.vi		Similar to interpolated tree map..			
FUNCTION GENERATOR MATRIX	X	X	X	X	I			FunctionGeneratorMatrix_Add.vi		Similar to interpolated tree map..			
	X	X	X	X	I			FunctionGeneratorMatrix_Calculate.vi					
	X	X	X	X	SI			FunctionGeneratorMatrix_New.vi		Similar to interpolated tree map..			

All on for auto filter...

LEAD LAG	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking	x
	X	X	X	X	I			LeadLag_Execute.vi						x
LINEAR FILTER	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking	x
	X	X		X	I			LinearFilter_BackwardFiniteDifference.vi						x
	X	X		X	SI			LinearFilter_Calculate.vi						x
	X	X	X	X	X			LinearFilter_CutoffFrequency.vi						x
	X	X	X	X	I		X	LinearFilter_Execute.vi		Labview style helper				x
	X	X		No	I			LinearFilter_Factorial.vi		AN INTERNAL ROUTINE				x
	X	X		X	I			LinearFilter_FiniteDifference.vi						x
	X	X		X	X			LinearFilter_HighPass.vi						x
	X	X	X	X	X			LinearFilter_HighPassBW1.vi						x
	X	X	X	X	X			LinearFilter_HighPassBW2.vi						x
	X	X	X	X	X			LinearFilter_LowPassBW1.vi						x
	X	X	X	X	X			LinearFilter_LowPassBW2.vi						x
	X	X		X	X			LinearFilter_MovingAverage.vi						x
	X	X		X	I			LinearFilter_New.vi						x
	X	X		X	SI			LinearFilter_Reset.vi						x
	X	X	X	X	SI			LinearFilter_ResetToValue.vi						x
	X	X		X	X			LinearFilter_SinglePoleIIR.vi						x
	X	X	X	X	X			LinearFilter_TimeConst.vi						x
MEDIAN FILTER	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking	x
	X	X		X	X			MedianFilter_Calculate.vi						x
	X	X	X	X	I		X	MedianFilter_Execute.vi		Labview style helper				x
	X	X		X	SI			MedianFilter_New.vi						x
	X	X		X	SI			MedianFilter_Reset.vi						x
	X	X	X	X	SI			MedianFilter_ResetToValue.vi						x
SLEW RATE FILTER	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking	x
	X	X		X	I			SlewRateLimiter_Calculate.vi						x
	X	X	X	X	SI			SlewRateLimiter_Close.vi						x
	X	X	X	X	I		X	SlewRateLimiter_Execute.vi		Labview style helper				x
	X	X	X	X	SI			SlewRateLimiter_GetRate.vi						x
	X	X		X	I			SlewRateLimiter_New.vi						x
	X	X		X	I			SlewRateLimiter_NewInitialZero.vi						x
	X	X		X	I			SlewRateLimiter_Reset.vi						x
	X	X		X	SI			SlewRateLimiter_SetRate.vi						x
	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking	x

TIME INTERPOLATABLE ROTATION2D	Implemented	Documented	Not WPI/LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking	x
	X	X	X	X	I			TimeInterpRotation2d_AddSample.vi		Update to use create matrix				x
	X	X	X	No	I			TimeInterpRotation2d_CleanUp.vi		Update to use create matrix				x
	X	X	X	X	SI			TimeInterpRotation2d_Clear.vi						x
	X	X	X	X	SI			TimeInterpRotation2d_GetNewestSample.vi						x
	X	X	X	X	I			TimeInterpRotation2d_GetSample.vi						x
								TimeInterpRotation2d_GetTimeForValue.vi						x
	X	X	X	X	SI			TimeInterpRotation2d_New.vi						x
	X	X	X	X	SI			TimeInterpRotation2d_PopOldestSample.vi						x
	X	X	X	X	SI			TimeInterpRotation2d_SetMaxTime.vi						x
TIME INTERPOLATABLE VARIANT	Implemented	Documented	Not WPI/LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking	x
	X	X	X	X	I			TimeInterpVariant_AddSample.vi		Update to use create matrix				x
	X	X	X	No	I			TimeInterpVariant_CleanUp.vi		Update to use create matrix				x
	X	X	X	X	SI			TimeInterpVariant_Clear.vi						x
	X	X	X	X	SI			TimeInterpVariant_GetNewestSample.vi						x
	X	X	X	X	I			TimeInterpVariant_GetSample.vi						x
								TimeInterpVariant_GetTimeForValue.vi						x
	X	X	X	X	I			TimeInterpVariant_Interpolate.vi		This is a template for a user created routine.				x
	X	X	X	X	SI			TimeInterpVariant_New.vi						x
	X	X	X	X	SI			TimeInterpVariant_PopOldestSample.vi						x
	X	X	X	X	SI			TimeInterpVariant_SetMaxTime.vi						x
WAIT ADJUST	Implemented	Documented	Not WPI/LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking	x
	X	X	X	X				WaitAdjust.vi						x
DIGITAL SEQUENTIAL LOGIC	Implemented	Documented	Not WPI/LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking	x
	X	X	X	X				DigSeqLogic_Delay.vi						x
	X	X	X	X				DigSeqLogic_On_Delay.vi						x
	X	X	X	X				DigSeqLogic_Off_Delay.vi						x
	X	X	X	X				DigSeqLogic_One_Shot.vi						x
	X	X	X	X				DigSeqLogic_SR_Flip_Flop.vi						x
DEBOUNCER	Implemented	Documented	Not WPI/LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking	x
	X	X		X				Debouncer_New.vi						x
	X	X		X				Debouncer_Calculate.vi						x
	X	X	X	X				Debouncer_Execute.vi						x
	X	X		No				Debouncer_Reset.vi						x
	X	X		No				Debouncer_HasElapsed.vi						x

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CONTROLLER

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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
ARM FF	X	X		X				ArmFF_Calculate.vi					
	X	X		X				ArmFF_CalculateVelocityOnly.vi					
			X					ArmFF_Execute.vi		LabVIEW style single call			
			X					ArmFF_ExecuteVelocityOnly.vi		LabVIEW style single call			
	X	X		X				ArmFF_MaxAchieveAccel.vi					
	X	X		X				ArmFF_MaxAchieveVelocity.vi					
	X	X		X				ArmFF_MinAchieveAccel.vi					
	X	X		X				ArmFF_MinAchieveVelocity.vi					
	X	X		X				ArmFF_New_ZeroGravity.vi					
	X	X		X				ArmFF_New.vi					
BANG BANG	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
	X	X		X	SI			BangBang_AtSetpoint.vi					
	X	X		X	SI			BangBang_Calculate_PV.vi					
	X	X		X	SI			BangBang_Calculate_SP_PV.vi					
	X	X	X	X	SI			BangBang_Execute.vi					
	X	X		X	SI			BangBang_GetAll.vi					
	X	X		X	SI			BangBang_GetError.vi					
	X	X		X	SI			BangBang_New.vi					
	X	X		X	SI			BangBang_SetSetpoint.vi					
	X	X		X	SI			BangBang_SetTolerance.vi					
CONTROLLER UTIL	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
	X	X		X	SI			ControllerUtil_GetModulusError.vi		This was short lived in WPILIB, but still useful here.			
ELEV FF	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
	X	X		X				ElevFF_Calculate.vi					
	X	X		X				ElevFF_CalculateVelocityOnly.vi					
			X					ElevFF_Execute.vi		LabVIEW style single call			
			X					ElevFF_ExecuteVelocityOnly.vi		LabVIEW style single call			
	X	X		X				ElevFF_MaxAchieveAccel.vi					
	X	X		X				ElevFF_MaxAchieveVelocity.vi					
	X	X		X				ElevFF_MinAchieveAccel.vi					
	X	X		X				ElevFF_MinAchieveVelocity.vi					
	X	X		X				ElevFF_New_ZeroAccel.vi					
	X	X		X				ElevFF_New.vi					

HOL_DRV_CTRL	Implemented	Documented	Not WPI/LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking	x
	X	X	X	X				HolDrvCtrl_AdvCalculate_Trajectory.vi		Added 1/24/2022				x
	X	X	X	X				HolDrvCtrl_AdvCalculate.vi		Added 1/24/2022				x
	X	X		X	SI			HolDrvCtrl_AtReference.vi		Added 1/26/21				x
	X	X		X	I			HolDrvCtrl_Calculate_Trajectory.vi		Added 1/26/21				x
	X	X		X	I			HolDrvCtrl_Calculate.vi		Added 1/26/21				x
	X	X	X	X				HolDrvCtrl_Execute_Trajectory.vi		Added 1/24/2022				x
	X	X	X	X				HolDrvCtrl_Execute.vi		Future				x
	X	X		X	SI			HolDrvCtrl_New.vi		Added 1/26/21				x
	X	X	X	X	SI			HolDrvCtrl_PackExecuteSP.vi						x
	X	X	X	X				HolDrvCtrl_PackPID.vi		Added 1/24/2022				x
	X	X	X	X				HolDrvCtrl_PackProfPID.vi		Added 1/24/2022				x
	X	X		X	SI			HolDrvCtrl_SetEnabled.vi		Added 1/26/21				x
	X	X		X	SI			HolDrvCtrl_SetTolerance.vi		Added 1/26/21				x
PID AUTOTUNE	Implemented	Documented	Not WPI/LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking	x
	X	X	X	No				PIDAutoTune_ClosedLoopStep.vi						x
	X	X	X	No				PIDAutoTune_Convert_Academic_To_NonInteracting.vi						x
	x	X	X	No				PIDAutoTune_OpenLoopStep.vi						x
	X	X	X	X				PIDAutoTune_SetTuningArguments.vi						x
	X	X	X	X				PIDAutoTune_Step_Execute.vi						x
PID CONTROLLER	Implemented	Documented	Not WPI/LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking	x
	X	X	X	X				PIDController_AdvCalculate_FF_Sp_Pv_Per.vi		Advanced PID				x
	X	X	X	X				PIDController_AdvCalculate_FF_Sp_Pv.vi		Advanced PID				x
	X	X	X	X			X	PIDController_AdvExecute.vi		Labview style helper. Advanced PID				x
	X	X		X	SI			PIDController_AtSetpoint.vi						x
	X	X		X				PIDController_Calculate_PV.vi						x
	X	X		X				PIDController_Calculate_SP_PV.vi						x
	X	X		X	SI			PIDController_DisableContinousInput.vi						x
	X	X		X	SI			PIDController_EnableContinousInput.vi						x
	X	X	X	X			X	PIDController_Execute.vi		Labview style helper				x
								PIDController_GetContinuousError.vi		OBSOLETE – Removed				x
	X	X		X	SI			PIDController_GetPeriod.vi						x
	X	X		X	SI			PIDController_GetPID.vi						x
	X	X		X	SI			PIDController_GetPositionError.vi						x
	X	X		X	SI			PIDController_GetSetpoint.vi						x
	X	X		X	SI			PIDController_GetTolerance.vi						x
	X	X		X	SI			PIDController_GetVelocityError.vi						x
	X	X		X	SI			PIDController_IsContinuousInputEnabled.vi						x
	X	X		X	I			PIDController_New.vi						x
	X	X		X	I			PIDController_NewPeriod.vi						x
	X	X	X	X	SI			PIDController_Pack_AdvLimits.vi						x
	X	X	X	X	SI			PIDController_Pack_AdvTuning.vi						x
	X	X	X	X	SI			PIDController_Pack_ErrorTolerance.vi						x
	X	X	X	X	SI			PIDController_Pack_InputLimits.vi						x
	X	X	X	X	SI			PIDController_Pack_Tuning.vi						x
	X	X		X	SI			PIDController_Reset.vi						x
	X	X		X	SI			PIDController_SetD.vi						x
	X	X	X	X	SI			PIDController_SetDerivativeFilter.vi		Advanced PID				x
	X	X	X	No				PIDController_SetFeedForward_OBSOLETE_DELETE.vi		Advanced PID, Obsolete – DELETE				x

X	X	X	No				PIDController_SetFFGain_OBSOLETE_DELETE.vi		Advanced PID, Obsolete – DELETE				
X	X		X	SI			PIDController_SetI.vi						
							PIDController_SetInputRange.vi		OBSOLETE – Removed				
X	X		X	SI			PIDController_SetIntegratorRange.vi						
X	X	X	X	SI			PIDController_SetOutputLimits.vi		Advanced PID				
X	X		X	SI			PIDController_SetP.vi						
X	X	X	X	SI			PIDController_SetPeriod.vi						
X	X		X	SI			PIDController_SetPID.vi						
X	X	X	X	SI			PIDController_SetPIDF.vi		Advanced PID				
X	X		X	SI			PIDController_SetSetpoint.vi						
X	X		X	SI			PIDController_SetTolerance.vi						
X	X		X	SI			PIDController_SetTolerancePandV.vi						

PROFIED PID CONTROLLER	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
	X	X		X	SI			ProfiledPIDController_AtGoal.vi					
	X	X		X	SI			ProfiledPIDController_AtSetpoint.vi					
	X	X		X				ProfiledPIDController_Calculate_Meas_Goal.vi					
	X	X		X				ProfiledPIDController_Calculate_Meas_StateGoal_TrapCnsrt.vi					
	X	X		X				ProfiledPIDController_Calculate_Meas_StateGoal.vi					
	X	X		X				ProfiledPIDController_Calculate_Meas.vi					
	X	X		X	SI			ProfiledPIDController_DisableContInput.vi					
	X	X		X	SI			ProfiledPIDController_EnableContInput.vi					
	X	X	X	X	I			ProfiledPIDController_Execute.vi		Single call LabVIEW style function.			
	X	X		X	SI			ProfiledPIDController_GetGoal.vi					
	X	X		X	SI			ProfiledPIDController_GetPeriod.vi					
	X	X	X	X	SI			ProfiledPIDController_GetPID.vi		WPILIB has separate getters.			
	X	X		X	SI			ProfiledPIDController_GetPositionError.vi					
	X	X		X	SI			ProfiledPIDController_GetSetpoint.vi					
	X	X		X	SI			ProfiledPIDController_GetTolerance.vi					
	X	X		X	SI			ProfiledPIDController_GetVelocityError.vi					
	X	X		X	I			ProfiledPIDController_New.vi					
	X	X		X	I			ProfiledPIDController_NewPeriod.vi					
	X	X		X	SI			ProfiledPIDController_Reset_PosOnly.vi					
	X	X		X	SI			ProfiledPIDController_Reset_PosVel.vi					
	X	X		X	SI			ProfiledPIDController_Reset.vi					
	X	X		X	SI			ProfiledPIDController_SetConstraints.vi					
	X	X		X	SI			ProfiledPIDController_SetGoal_PosOnly.vi					
	X	X		X	SI			ProfiledPIDController_SetGoal.vi					
	X	X		X	SI			ProfiledPIDController_SetIntegratorRange.vi					
	X	X		X	SI			ProfiledPIDController_SetPID.vi					
	X	X		X	SI			ProfiledPIDController_SetTolerance_PosOnly.vi					
	X	X		X	SI			ProfiledPIDController_SetTolerance_PosVel.vi					

RAMSETE	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
	X	X		X	SI			Ramsete_AtReference.vi	AtReference				
	X	X		X				Ramsete_Calculate_Trajectory.vi	calculate_trajectory				
	X	X		X				Ramsete_Calculate.vi	calculate				
	X	X	X	X				Ramsete_Diff_DO_Eng.vi					
	X	X	X	X				Ramsete_Diff_DO_SI.vi					
	X	X	X	X	I			Ramsete_Execute_ENG.vi	Use this one!!				
	X	X	X	X	SI			Ramsete_Execute_PackTuning_ENG.vi					
	X	X	X	X	SI			Ramsete_Execute_PackTuning.vi					
	X	X	X	X	I			Ramsete_Execute.vi					
	X	X		X	SI			Ramsete_New_B_Z.vi	new(b, zeta)				
	X	X		X	SI			Ramsete_New.vi	new				
	X	X		X	SI			Ramsete_SetEnabled.vi	SetEnabled				
	X	X		X	SI			Ramsete_SetTolerance.vi	SetTolerance				

X	X		X	SI			Pose2d_getTranslation.vi	translation2d getTranslation()	can also use cluster unpack			
X	X	X	X	SI			Pose2d_getXY.vi					
X	X	X	X	SI			Pose2d_getXYAngle.vi					
X	X		X	I			Pose2d_Interpolate.vi					
X	X		X	X			Pose2d_Log.vi	twist2d log(pose2d end)				
X	X		X	SI			Pose2d_Minus.vi	transform2d minus(pose2d other)				
X	X		X	SI			Pose2d_New_TRRO.vi	pose2d new(translation2d, rotation2d)				
X	X		X	SI			Pose2d_New.vi	pose2d new(double x, double y, rotation2d)				
X	X		X	SI			Pose2d_Plus.vi	pose2d plus(transform2d other)				
X	X		X	SI			Pose2d_RelativeTo.vi	pose2d relativeto(pose2d other)				
X	X		X	SI			Pose2d_Times.vi					
X	X		X	SI			Pose2d_TransformBy.vi	pose2d transformby(transform2d other)				
								pose2d new()	can use cluster constant			

POSE3D	Implemented	Documented	Not WPI/LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
	X	X		X	SI			Pose3d_Div.vi					
	X	X		X	SI			Pose3d_Equals.VI					
	X	X		X	X			Pose3d_Exp.vi					
	X	X		X	SI			Pose3d_getRotation.vi					
	X	X		X	SI			Pose3d_getTranslation.vi					
	X	X	X	X	SI			Pose3d_getXYZ.vi					
	X	X		X	I			Pose3d_Interpolate.vi					
	X	X		X	X			Pose3d_Log.vi					
	X	X		X	SI			Pose3d_Minus.vi					
	X	X		X	SI			Pose3d_New.vi					
	X	X		X	SI			Pose3d_New_Default.vi					
	X	X		X	SI			Pose3d_New_Pose2d.vi					
	X	X		X	SI			Pose3d_New_Trans3dRot3d.vi					
	X	X		X	SI			Pose3d_Plus.vi					
	X	X		X	SI			Pose3d_RelativeTo.vi					
	X	X		No	SI			Pose3d_RotationVectorToMatrix.vi					
	X	X		X	SI			Pose3d_ToPose2d.vi					
	X	X		X	SI			Pose3d_Times.vi					
	X	X		X	SI			Pose3d_TransformBy.vi					

QUATERNION	Implemented	Documented	Not WPI/LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
	X	X		X	SI			Quaternion_Equals.vi					
	X	X		X	SI			Quaternion_Get_All.vi					
	X	X		X	SI			Quaternion_Get_LVQuat.vi					
	X	X		X	SI			Quaternion_Get_Vect.vi					
	X	X		X	SI			Quaternion_Get_W.vi					
	X	X		X	SI			Quaternion_Inverse.vi					
	X	X		X	SI			Quaternion_New.vi					
	X	X		X	SI			Quaternion_New_Default.vi					
	X	X		X	SI			Quaternion_New_LVQuat.vi					
	X	X		X	SI			Quaternion_Normalize.vi					
	X	X		X	SI			Quaternion_Plus.vi					
	X	X		X	SI			Quaternion_Times.vi					
	X	X		X	SI			Quaternion_ToRotationVector.vi					

Implemented	Documented	Not WPI/LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
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ROTATION2D

X	X		X	SI			Rotation2d_CreateAngle.vi	rotation2d new(double value)				
X	X		X	SI			Rotation2d_CreateAngleDegrees.vi	rotation2d fromDegrees(double degrees)	convert to radians then create			
X	X		X	SI			Rotation2d_CreateAngleRotations.vi					
X	X		X	SI			Rotation2d_CreateXY.vi	rotation2d new(double x, double y)				
X	X		X	SI			Rotation2d_Div.vi					
X	X		X	SI			Rotation2d_Equals.vi	boolean equals(rotation2d other)				
X	X	X	X	SI			Rotation2d_GetAngleCosSin.vi		New 1/26/21			
X	X		X	SI			Rotation2d_GetCos.VI	double getCos()	use cluster unpack			
X	X		X	SI			Rotation2d_GetDegrees.VI	double getDegrees()	use cluster unpack, then convert to degree			
X	X		X	SI			Rotation2d_GetRadians.VI	double getRadians()	use cluster unpack			
X	X		X	SI			Rotation2d_GetRotations.vi					
X	X		X	SI			Rotation2d_GetSin.VI	double getSin()	use cluster unpack			
X	X		X	SI			Rotation2d_GetTan.VI	double getTan()	can calculate			
X	X		X	SI			Rotation2d_Interpolate.vi					
X	X		X	SI			Rotation2d_Minus.vi	rotation2d minus(rotation2d other)				
X	X		X	SI			Rotation2d_Plus.vi	rotation2d plus(rotation2d other)				
X	X		X	SI			Rotation2d_RotateBy.vi	rotation2d rotateby(rotation2d other)				
X	X		X	SI			Rotation2d_Times.vi	rotation2d times(double scalar)				
X	X		X	SI			Rotation2d_UnaryMinus.vi	rotation2d unaryminus()				
								rotation2d new()	can use cluster constant			

ROTATION3D

Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
X	X		X	SI			Rotation3d_Create_AxisAngle.vi					
X	X		X	SI			Rotation3d_Create_Default.vi					
X	X		X	SI			Rotation3d_Create_Quaternion.vi					
X	X		X	I			Rotation3d_Create_InitialFinalVector.vi					
X	X		X	SI			Rotation3d_Create_RollPitchYaw.vi					
X	X		X	I			Rotation3d_Create_RotMatrix.vi					
X	X		X	SI			Rotation3d_Div.vi					
X	X		X	SI			Rotation3d_Equals.vi					
X	X	X	X	SI			Rotation3d_GetAxisAngle.vi					
X	X		X	SI			Rotation3d_GetQuaternion.vi					
X	X		X	SI			Rotation3d_GetXYZ.vi					
X	X		X	SI			Rotation3d_Interpolate.vi					
X	X		X	SI			Rotation3d_Minus.vi					
X	X		X	SI			Rotation3d_Plus.vi					
X	X		X	SI			Rotation3d_RotateBy.vi					
X	X		X	SI			Rotation3d_Times.vi					
X	X		X	SI			Rotation3d_ToRotation2d.vi					
X	X		X	SI			Rotation3d_UnaryMinus.vi					

TRANSFORM2D

Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
X	X		X	SI			Transform2d_Create_PosePose.vi	transform2d new(pose2d, pose2d)				
X	X		X	SI			Transform2d_Create_TransRot.vi	transform2d new(translation2d, rotation2d)				
X	X		X	SI			Transform2d_Div.vi					
X	X		X	SI			Transform2d_Equals.VI	boolean equals(other transform2d)				
X	X		X	SI			Transform2d_GetRotation.VI	rotation2d getRotation()	use cluster unpack			
X	X		X	SI			Transform2d_GetTranslation.VI	translation2d getTranslation()	use cluster unpack			
X	X	X	X	SI			Transform2d_GetXY.vi					
X	X	X	X	SI			Transform2d_GetXYAngle.vi					
X	X		X	SI			Transform2d_Inverse.vi	transform inverse()	new			
X	X		X	SI			Transform2d_Plus.vi					
X	X		X	SI			Transform2d_Times.vi	transform2d times(double scalar)				
								transform2d new()	can use cluster constant			

TRANSFORM3D	Implemented	Documented	Not WPI/LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking	x
	X	X		X	SI			Transform3d_Create_Default.vi						x
	X	X		X	SI			Transform3d_Create_Pose3dPose.3dvi						x
	X	X		X	SI			Transform3d_Create_Trans3dRot3d.vi						x
	X	X		X	SI			Transform3d_Div.vi						x
	X	X		X	SI			Transform3d_Equals.VI						x
	X	X		X	SI			Transform3d_GetRotation3d.VI						x
	X	X		X	SI			Transform3d_GetTranslation3d.VI						x
	X	X	X	X	SI			Transform3d_GetXYZ.vi						x
	X	X		X	SI			Transform3d_Inverse.vi						x
	X	X		X	SI			Transform3d_Plus.vi						x
	X	X		X	SI			Transform3d_Times.vi						x
														x
														x
TRANSLATION2D	Implemented	Documented	Not WPI/LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking	x
	X	X		X	SI			Translation2d_Create_DistAng.vi						x
	X	X		X	SI			Translation2d_Create.vi	translation2d new(double x, double y)					x
	X	X		X	SI			Translation2d_Div.vi						x
	X	X		X	SI			Translation2d_Equals.vi	boolean equals(translation other)					x
	X	X		X	SI			Translation2d_GetAngle.vi						x
	X	X		X	SI			Translation2d_GetDistance.vi	double getDistance(translation2d other)					x
	X	X		X	SI			Translation2d_GetNorm.VI	double getNorm()	can use cluster unpack				x
	X	X		X	SI			Translation2d_GetX.VI	double getX()	can use cluster unpack				x
	X	X	X	X	SI			Translation2d_GetXY.VI						x
	X	X		X	SI			Translation2d_GetY.VI	double getY()	can use cluster unpack				x
	X	X		X	SI			Translation2d_Interpolate.vi						x
	X	X		X	SI			Translation2d_Minus.vi	translation2d minus(translation2d other)					x
	X	X		X	SI			Translation2d_Plus.vi	translation2d plus(translation2d other)					x
	X	X		X	SI			Translation2d_RotateBy.vi	translation2d rotateBy(rotation2d other)					x
	X	X		X	SI			Translation2d_Times.vi	translation2d times(double scalar)					x
	X	X		X	SI			Translation2d_UnaryMinus.vi	translation2d unaryminus()					x
									translation2d new()	can use cluster constant				x
									translation2d div(double scalar)	can multiply by 1/scalar				x
TRANSLATION3D	Implemented	Documented	Not WPI/LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking	x
	X	X		X	SI			Translation3d_Create.vi						x
	X	X		X	SI			Translation3d_Create_Default.vi						x
	X	X		X	SI			Translation3d_Create_DistAng.vi						x
	X	X		X	SI			Translation3d_Div.vi						x
	X	X		X	SI			Translation3d_Equals.vi						x
	X	X		X	SI			Translation3d_GetDistance.vi						x
	X	X		X	SI			Translation3d_GetNorm.VI						x
	X	X	X	X	SI			Translation3d_GetXYZ.vi						x
	X	X		X	SI			Translation3d_Interpolate.vi						x
	X	X		X	SI			Translation3d_Minus.vi						x
	X	X		X	SI			Translation3d_Plus.vi						x
	X	X		X	SI			Translation3d_RotateBy.vi						x
	X	X		X	SI			Translation3d_Times.vi						x
	X	X		X	SI			Translation3d_ToTranslation2d.vi						x
	X	X		X	SI			Translation3d_UnaryMinus.vi						x
														x
														x

TWIST2D	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
	X	X		X	SI			Twist2d_Create.vi	twist new(x, y, theta)				
	X	X		X	SI			Twist2d_Equals.VI	boolean equals(obj other)				
	X	X	X	X	SI			Twist2d_GetAll.VI					
TWIST3D	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
	X	X		X	SI	X		Twist3d_Create.vi					
	X	X		X	SI	X		Twist3d_Equals.VI					
	X	X	X	X	SI	X		Twist3d_GetAll.VI					
KINEMATICS													
CHASSIS SPEEDS	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
	X	X		X	SI			ChassisSpeeds_FromFieldRelativeChassisSpeeds.VI					
	X	X		X	SI			ChassisSpeeds_FromFieldRelativeSpeeds.VI	chassisspeeds fromFieldRelativeSpeeds(double x, double y, double angvel, rotation2d robotangle)				
	X	X	X	X	SI			ChassisSPeeds_GetXYOmega.vi					
	X	X		X	SI			ChassisSpeeds_New.vi	chassisspeeds new (double xvel, double yvel, double angvel)				
									chassisspeeds new ()	can use cluster constant			
DIFFERENTIAL DRIVE KINEMATICS	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
	X	X		X	I	X		DiffKinematics_New.vi	diffDriveKine new(double trackWidth)				
	X	X		X	X	X		DiffKinematics_toChassisSpeed.vi	chassisSpeeds toChassisSpeeds(diffDrWheelSpeeds)				
	X	X		X	SI			DiffKinematics_ToTwist2d.vi					
	X	X		X	SI	X		DiffKinematics_toWheelSpeed.vi	diffDriveWheelSpeed toWheelSpeeds(chassisSpeeds)				
DIFFERENTIAL DRIVE ODOMETRY	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
			X					DiffOdometry_Execute.vi		DONT NEED			
	X	X		X	X			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()				

DIFFERENTIAL DRIVE ODOMETRY 2	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking	x
	X	X	X	X	I			DiffDrvOdom2_Execute.vi		Replacement for orig diff drive odom				x
	X	X		X	SI			DiffDrvOdom2_GetPose.vi						x
	X	X		X	I			DiffDrvOdom2_New.vi						x
	X	X		X	SI			DiffDrvOdom2_Reset.vi						x
	X	X		X	I			DiffDrvOdom2_Update.vi						x
														x
DIFFERENTIAL DRIVE WHEEL SPEEDS	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking	x
									diffDrWheelSpeeds new()					x
									diffDrWheelSpeeds new(double leftVel, double rightVel)					x
	X	X		X	X			DiffWheel_Normalize.vi	void normalize(double maxVel)					x
MECANUM DRIVE KINEMATICS	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking	x
	X	X		X	I			MecaKinematics_New.vi						x
	X	X		X	X			MecaKinematics_SetInverseKinematics.vi						x
	X	X		X	X			MecaKinematics_ToChassisSpeeds.vi						x
	X	X		X				MecaKinematics_ToTwist2d.vi						x
	X	X		X	X			MecaKinematics_ToWheelSpeeds.vi						x
	X	X		X	X			MecaKinematics_ToWheelSpeedsZeroCenter.vi						x
MECANUM DRIVE MOTOR VOLTAGE	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking	x
														x
nothing done														x
MECANUM DRIVE ODOMETRY	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking	x
			X					MecaOdometry_Execute.vi						x
	X	X	X	X	X			MecaOdometry_GetKinematics.vi						x
	X	X		X				MecaOdometry_GetPose.vi						x
	X	X		X				MecaOdometry_New.vi						x
	X	X		X				MecaOdometry_NewDefaultPose.vi						x
	X	X		X				MecaOdometry_Reset.VI						x
	X	X		X				MecaOdometry_Update.vi						x
								MecaOdometry_UpdateWithTime.vi		Removed...				x

MECANUM DRIVE WHEEL POSITION	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking	x
	X	X		X	S/			MecaWheelPos_Get.vi						x
	X	X		X	S/			MecaWheelPos_New.vi						x
	X	X		X	S/			MecaWheelPos_Sub.vi						x
MECANUM DRIVE WHEEL SPEEDS	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking	x
	X	X		X	S/			MecaWheel_New.Vi	public MecanumDriveWheelSpeeds(double frontLeftMetersPerSecond, double frontRightMetersPerSecond, double rearLeftMetersPerSecond, double rearRightMetersPerSecond)					x
	X	X	X	X	S/			MecaWheel_GetAll.vi						x
	X	X		X	X			MecaWheel_Normalize.vi	public void normalize(double attainableMaxSpeedMetersPerSecond)					x
SWERVE DRIVE KINEMATICS	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking	x
	X	X	X	X				SwerveKinematics_New4.VI		For 4 module drives				x
	X	X	X	X				SwerveKinematics_NewX.VI		uses array as input				x
	X	X	X	X				SwerveKinematics_NormalizeWheelSpeeds.vi	public static void normalizeWheelSpeeds(SwerveModuleState[] moduleStates, double attainableMaxSpeedMetersPerSecond)					x
	X	X	X	X				SwerveKinematics_ToChassisSpeeds4.VI		For 4 module drives				x
	X	X	X	X				SwerveKinematics_ToChassisSpeedsX.VI		uses array as input				x
	X	X		X				SwerveKinematics_ToSwerveModuleStates.VI	public SwerveModuleState[] toSwerveModuleStates(ChassisSpeeds chassisSpeeds, Translation2d centerOfRotationMeters)					x
	X	X		X				SwerveKinematics_ToSwerveModuleStatesZeroCenter.VI	public SwerveModuleState[] toSwerveModuleStates(ChassisSpeeds chassisSpeeds)					x
	X	X		X				SwerveKinematics_ToTwist2d4.VI						x
	X	X		X				SwerveKinematics_ToTwist2dX.VI						x
									public SwerveDriveKinematics(Translation2d... wheelsMeters)	variable parameters (replace with array and "4" calls)				x
									public ChassisSpeeds toChassisSpeeds(SwerveModuleState... wheelStates)	variable parameters (replace with array and "4" calls)				x
SWERVE DRIVE ODOMETRY	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking	x
								SwerveOdometry_Execute4.vi						x
								SwerveOdometry_ExecuteX.vi						x
	X	X		X				SwerveOdometry_GetPosition.VI	public Pose2d getPoseMeters()					x
	X	X		X				SwerveOdometry_New.VI	public SwerveDriveOdometry(SwerveDriveKinematics kinematics, Rotation2d gyroAngle, Pose2d initialPose)					x
	X	X		X				SwerveOdometry_NewZeroCenter.VI	public SwerveDriveOdometry(SwerveDriveKinematics kinematics, Rotation2d gyroAngle)					x
	X	X		X	S/			SwerveOdometry_ResetPosition.VI	public void resetPosition(Pose2d pose, Rotation2d gyroAngle)					x
	X	X	X	X				SwerveOdometry_Update4.VI		For 4 module drives				x
								SwerveOdometry_UpdateWithTime4.VI		REMOVED				x
								SwerveOdometry_UpdateWithTimeX.VI		REMOVED				x
	X	X	X	X				SwerveOdometry_UpdateX.VI		uses array as input				x
									public Pose2d updateWithTime(double currentTimeSeconds, Rotation2d gyroAngle, SwerveModuleState... moduleStates)	variable parameters (replace with array and "4" calls)				x

FRC_LabVIEW_Trajectory_Library_Routines.xlsx

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TRAJECTORY	Implemented	Documented	Not WPI/LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking	
	X	X		X				Trajectory_Concatenate.vi						X
	X	X		X				Trajectory_equals.vi	boolean equals(other obj)	FUTURE				X
	X	X		X	SI			Trajectory_GetStates.vi	public List<State> getStates()	not needed, use unpack				X
	X	X		X	SI			Trajectory_GetTotalTime.vi	public double getTotalTimeSeconds()	not needed, use unpack				X
	X	X		No	SI			Trajectory_lerp_double.vi	private static double lerp(double startValue, double endValue, double t)	internal				X
	X	X		No	SI			Trajectory_lerp_Pose.vi	private static Pose2d lerp(Pose2d startValue, Pose2d endValue, double t)	internal				X
	X	X		X	SI			Trajectory_New_Empty.vi						X
	X	X		X	SI			Trajectory_New.vi	public Trajectory(final List<State> states)					X
	X	X		X				Trajectory_RelativeTo.vi	public Trajectory relativeTo(Pose2d pose)					X
	X	X		X				Trajectory_Sample.vi	public State sample(double timeSeconds)					X
	X	X	X	X				Trajectory_SampleReverse.vi		Sample in reverse order. Negate sample.				X
	X	X		X				Trajectory_TransformBy.vi	public Trajectory transformBy(Transform2d transform)					X
									public Pose2d getInitialPose()	can use cluster unpack, array index				X
TRAJECTORY_STATE	Implemented	Documented	Not WPI/LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking	
	X	X		X	SI			TrajectoryState_Equals.vi	boolean equals(other obj)					X
	X	X	X	X	SI			TrajectoryState_GetAll.vi						X
	X	X		X	SI			TrajectoryState_GetPose.vi						X
	X	X		X				TrajectoryState_Interpolate.vi	State interpolate(State endValue, double i)					X
	X	X		X	SI			TrajectoryState_New.vi	public State(double timeSeconds, double velocityMetersPerSecond, double accelerationMetersPerSecondSq, Pose2d poseMeters, double curvatureRadPerMeter)					X
									public State()					X
TRAJECTORY CONFIG	Implemented	Documented	Not WPI/LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking	
	X	X		X				TrajectoryConfig_AddConstraint.vi	public TrajectoryConfig addConstraint(TrajectoryConstraint constraint)	Implemented differently, can't duplicate.				X
	X	X		X				TrajectoryConfig_AddConstraints.vi	public TrajectoryConfig addConstraints(List<? extends TrajectoryConstraint> constraints)	Implemented differently, can't duplicate.				X
	X	X		X	SI			TrajectoryConfig_Create.vi	public TrajectoryConfig(double maxVelocityMetersPerSecond, double maxAccelerationMetersPerSecondSq)					X
	X	X		X				TrajectoryConfig_GetCentripetalAccel.vi						X
	X	X	X	X				TrajectoryConfig_GetConstraints.vi	public List<TrajectoryConstraint> getConstraints()	Implemented differently, can't duplicate.				X
	X	X		X				TrajectoryConfig_GetEndVelocity.vi	public double getEndVelocity()	can use cluster unpack				X
	X	X		X				TrajectoryConfig_GetKinematicsDiffDrive.vi						X
	X	X		X				TrajectoryConfig_GetKinematicsMecanumfDrive.vi						X
	X	X		X				TrajectoryConfig_GetKinematicsSwerveDrive.vi						X
	X	X	X	X				TrajectoryConfig_GetMaxVelAccel.vi						X
	X	X		X				TrajectoryConfig_GetStartVelocity.vi	public double getStartVelocity()	can use cluster unpack				X
	X	X		X				TrajectoryConfig_GetVoltageDiffDrive.vi						X
	X	X		X				TrajectoryConfig_IsReversed.vi	public boolean isReversed()	can use cluster unpack				X
	X	X	X	X	SI			TrajectoryConfig_setCentripetalAccel.vi						X
	X	X		X				TrajectoryConfig_SetEndVelocity.vi	public TrajectoryConfig setEndVelocity(double endVelocityMetersPerSecond)					X
	X	X		X	SI			TrajectoryConfig_setKinematicsDiffDrive.vi	public TrajectoryConfig setKinematics(DifferentialDriveKinematics kinematics)					X
	X	X		X	SI			TrajectoryConfig_setKinematicsMecanumfDrive.vi	public TrajectoryConfig setKinematics(MecanumDriveKinematics kinematics)					X

x
x

	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
DIFF DRIVE KINEMATIC CONSTRAINT	X	X		X				DiffDriveKinematicsConstraint_getMaxVelocity.vi	public double getMaxVelocityMetersPerSecond(Pose2d poseMeters, double curvatureRadPerMeter, double velocityMetersPerSecond)	
	X	X		X				DiffDriveKinematicsConstraint_getMinMaxAccel.vi	public MinMax getMinMaxAccelerationMetersPerSecondSq(Pose2d poseMeters, double curvatureRadPerMeter, double velocityMetersPerSecond)	
	X	X		X	SI			DiffDriveKinematicsConstraint_New.vi	public DifferentialDriveKinematicsConstraint(final DifferentialDriveKinematics kinematics, double maxSpeedMetersPerSecond)	

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x

	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
DIFF DRIVE VOLTAGE CONSTRAINT	X	X		X				DiffDriveVoltageConstraint_getMaxVelocity.vi	public double getMaxVelocityMetersPerSecond(Pose2d poseMeters, double curvatureRadPerMeter, double velocityMetersPerSecond)	
	X	X		X				DiffDriveVoltageConstraint_getMinMaxAccel.vi	public MinMax getMinMaxAccelerationMetersPerSecondSq(Pose2d poseMeters, double curvatureRadPerMeter, double velocityMetersPerSecond)	
	X	X		X	SI			DiffDriveVoltageConstraint_New.vi	public DifferentialDriveVoltageConstraint(SimpleMotorFeedforward feedforward, DifferentialDriveKinematics kinematics, double maxVoltage)	

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x

	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
ELLIPTICAL REGION CONSTRAINT	X	X		X				EllipRegionConstraint_getMaxVelocity.vi		
	X	X		X				EllipRegionConstraint_getMinMaxAccel.vi		
	X	X		X				EllipRegionConstraint_IsPoseInRegion.vi		
	X	X		X				EllipRegionConstraint_New.vi		

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	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
JERK CONSTRAINT	/		X					JerkConstraint_getMaxVelocity.vi	Routine exists, it is just a shell	FUTURE
	/		X					JerkConstraint_getMinMaxAccel.vi	Routine exists, it is just a shell	FUTURE
	/		X		SI			JerkConstraint_New.vi	Routine exists, it is just a shell	FUTURE

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	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
MAX VELOCITY CONSTRAINT	X	X		X	SI			MaxVelocityConstraint_getMaxVelocity.vi		
	X	X		X	SI			MaxVelocityConstraint_getMinMaxAccel.vi		
	X	X		X	SI			MaxVelocityConstraint_New.vi		

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MECANUM DRIVE KINEMATICS CONSTRAINT	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
	X	X		X				MecaDriveKinematicsConstraint_getMaxVelocity.vi		
	X	X		X				MecaDriveKinematicsConstraint_getMinMaxAccel.vi		
	X	X		X	SI			MecaDriveKinematicsConstraint_New.vi		

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RECTANGULAR REGION CONSTRAINT	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
	X	X		X				RectRegionConstraint_getRectRegion.vi		
	X	X		X				RectRegionConstraint_getMinMaxAccel.vi		
	X	X		X				RectRegionConstraint_IsPoseInRegion.vi		
	X	X		X				RectRegionConstraint_New.vi		

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SWERVE DRIVE KINEMATICS CONSTRAINT	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
	X	X		X				SwerveDriveKinematicsConstraint_getMaxVelocity.vi	public double getMaxVelocityMetersPerSecond(Pose2d poseMeters, double curvatureRadPerMeter, double velocityMetersPerSecond)	
	X	X		X				SwerveDriveKinematicsConstraint_getMinMaxAccel.vi	public MinMax getMaxMaxAccelerationMetersPerSecondSq(Pose2d poseMeters, double curvatureRadPerMeter, double velocityMetersPerSecond)	
	X	X		X	SI			SwerveDriveKinematicsConstraint_New.vi	Newpublic SwerveDriveKinematicsConstraint(final SwerveDriveKinematics kinematics, double maxSpeedMetersPerSecond)	Can use cluster pack for now

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TRAJECTORY CONSTRAINT	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
	X	X	X	X				TrajConstraint_GetMaxVelocity.vi		
	X	X	X	X				TrajConstraint_GetMinMaxAccel.vi		
	X	X	X	X				TrajConstraint_GetType.vi		

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TRAJECTORY CONSTRAINT (Min Max)	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
	X	X		X	SI			Constraint_MinMax_New.vi	Constraint_MinMax_New	
	X	X		X	SI			Constraint_MinMax_NewMinMax.VI	Constraint_MinMax_New	

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UTILITY

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

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

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CONVERSIONS

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

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

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

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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

PATHFINDERUTIL	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	
	X	X	X	X				PathfinderUtil_Continuous_Heading_Difference.vi			X
	X	X	X	X				PathfinderUtil_OptimizeTrajectoryStates.vi			X
	X	X	X	X				PathfinderUtil_ToTrajectory.vi			X
	X	X	X	X				PathfinderUtil_ToTrajectoryStates.vi			X

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STATE SPACE MODEL

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DC MOTOR	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking	
	X	X		X	SI			DCMotor_GetAndymark9015.vi						X
	X	X		X	SI			DCMotor_GetAndymarkAM2235A.vi						X
	X	X		X	SI			DCMotor_GetAndymarkAM3493.vi						X
	X	X		X	SI			DCMotor_GetAndymarkRs775_125.vi						X
	X	X		X	SI			DCMotor_GetBag.vi						X
	X	X		X	SI			DCMotor_GetBanebotsRs550.vi						X
	X	X		X	SI			DCMotor_GetBanebotsRs775.vi						X
	X	X		X	SI			DCMotor_GetCIM.vi						X
	X	X		X	SI			DCMotor_GetCurrent.vi						X
	X	X		X	SI			DCMotor_GetFalcon500.vi						X
	X	X		X	SI			DCMotor_GetMiniCIM.vi						X
	X	X		X	SI			DCMotor_GetNEO.vi						X
	X	X		X	SI			DCMotor_GetNEO550.vi						X
	X	X		X	SI			DCMotor_GetRomiBuiltIn.vi						X
	X	X		X	SI			DCMotor_GetSpeed.vi						X
	X	X		X	SI			DCMotor_GetTorque.vi						X
	X	X		X	SI			DCMotor_GetVex775Pro.vi						X
	X	X		X	SI			DCMotor_New.vi						X
	X	X		X	SI			DCMotor_PickMotor.vi						X
	X	X		X	SI			DCMotor_WithReduction.vi						X

	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
EXTENDED KALMAN FILTER	X	X		X				ExtendedKalmanFilter_Correct_OnlyUY.vi					
	X	X		X				ExtendedKalmanFilter_Correct.vi		Just a shell, not functional!			
	X	X		X				ExtendedKalmanFilter_GetP_Single.vi					
	X	X		X				ExtendedKalmanFilter_GetP.vi					
	X	X		X				ExtendedKalmanFilter_GetXHat_Single.vi					
	X	X		X				ExtendedKalmanFilter_GetXHat.vi					
	X	X		X				ExtendedKalmanFilter_New.vi					
	X	X		X				ExtendedKalmanFilter_Predict.vi					
	X	X		X				ExtendedKalmanFilter_Reset.vi					
	X	X		X				ExtendedKalmanFilter_SetP.vi					
	X	X		X				ExtendedKalmanFilter_SetXHat_Single.vi					
	X	X		X				ExtendedKalmanFilter_SetXHat.vi					

	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
KALMAN FILTER	X	X		X		X		KalmanFilter_Correct.vi					
	X	X		X				KalmanFilter_GetK					
	X	X		X				KalmanFilter_GetK_Single.vi					
	X	X		X				KalmanFilter_GetXHat					
	X	X		X		X		KalmanFilter_GetXHaT_Single					
	X	X		X		X		KalmanFilter_New.vi					
	X	X		X		X		KalmanFilter_Predict.vi					
	X	X		X				KalmanFilter_Reset.vi					
	X	X		X				KalmanFilter_SetXHat					
	X	X		X		X		KalmanFilter_SetXHat_Single					

	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
KALMAN FILTER LATENCY COMPENSATOR	X	X		X				KalmanFilterLatencyComp_AddObserverState.vi					
	X	X		X				KalmanFilterLatencyComp_ApplyPastGlobalMeas_FuncGroup.vi					
	X	X		X				KalmanFilterLatencyComp_ApplyPastGlobalMeasurement_UKF.vi					
	X	X		X				KalmanFilterLatencyComp_FindClosestMeasurement.vi					
	X	X		X				KalmanFilterLatencyComp_New.vi					
	X	X		X				KalmanFilterLatencyComp_Observer_New.vi					
	X	X		X				KalmanFilterLatencyComp_Reset.vi					

	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
MECANUM DRIVE POSE ESTIMATOR								MecaDrivePoseEst_AddVisionMeasurement_StdDev.vi					
	X	X		X				MecaDrivePoseEst_AddVisionMeasurement.vi					
	X	X		X				MecaDrivePoseEst_GetEstimatedPosition.vi					
	X	X		No				MecaDrivePoseEst_Kalman_F_Callback.vi					
	X	X		No				MecaDrivePoseEst_Kalman_H_Callback.vi					
	X	X		X				MecaDrivePoseEst_New.vi					
	X	X		X				MecaDrivePoseEst_ResetPosition.vi					

X	X		X			MecaDrivePoseEst_SetVisionMeasurementStdDevs.vi					
X	X		X			MecaDrivePoseEst_Update.vi					
X	X		X			MecaDrivePoseEst_UpdateWithTime.vi					
X	X		No			MecaDrivePoseEst_VisionCorrect_Callback.vi					
X	X		No			MecaDrivePoseEst_VisionCorrect_Kalman_H_Callback.vi					

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MECANUM DRIVE POSE ESTIMATOR 2

Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
X	X		X				MecaDrivePoseEst2_AddVisionMeasurement.vi					
X	X	X	NO	SI			MecaDrivePoseEst2_BufferDuration.vi					
X	X	X	X				MecaDrivePoseEst2_Execute.vi					
X	X		X	SI			MecaDrivePoseEst2_GetEstimatedPosition.vi					
X	X	X	No	SI			MecaDrivePoseEst2_InterpRecord_ExtractFromVar.vi					
X	X		No				MecaDrivePoseEst2_InterpRecord_Interp.vi					
X	X		No	SI			MecaDrivePoseEst2_InterpRecord_New.vi					
X	X		X				MecaDrivePoseEst2_New.vi					
X	X	X	X	SI			MecaDrivePoseEst2_Pack_Config.vi					
X	X		X	SI			MecaDrivePoseEst2_ResetPosition.vi					
X	X		X	SI			MecaDrivePoseEst2_SetVisionMeasurementStdDevs.vi					
X	X		X				MecaDrivePoseEst2_Update.vi					
X	X		X				MecaDrivePoseEst2_UpdateWithTime.vi					

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SWERVE DRIVE POSE ESTIMATOR

Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
							SwerveDrivePoseEst_AddVisionMeasurement_StdDev.vi					
X	X		X				SwerveDrivePoseEst_AddVisionMeasurement.vi					
X	X		X				SwerveDrivePoseEst_GetEstimatedPosition.vi					
X	X		X				SwerveDrivePoseEst_Kalman_F_Callback.vi					
X	X		X				SwerveDrivePoseEst_Kalman_H_Callback.vi					
X	X		X				SwerveDrivePoseEst_New.vi					
X	X		X				SwerveDrivePoseEst_ResetPosition.vi					
X	X		X				SwerveDrivePoseEst_SetVisionMeasurementStdDevs.vi					
X	X		X				SwerveDrivePoseEst_Update.vi					
X	X		X				SwerveDrivePoseEst_UpdateWithTime.vi					
X	X		X				SwerveDrivePoseEst_VisionCorrect_Callback.vi					
X	X		X				SwerveDrivePoseEst_VisionCorrect_Kalman_H_Callback.vi					

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SWERVE DRIVE POSE ESTIMATOR 2

Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
X	X		X				SwerveDrivePoseEst2_AddVisionMeasurement.vi					
X	X	X	No	SI			SwerveDrivePoseEst2_BufferDuration.vi					
X	X	X	X				SwerveDrivePoseEst2_Execute.vi					
X	X		X	SI			SwerveDrivePoseEst2_GetEstimatedPosition.vi					
X		X	No	SI			SwerveDrivePoseEst2_InterpRecord_ExtractFromVar.vi					
X			No				SwerveDrivePoseEst2_InterpRecord_Interp.vi					
X			No	SI			SwerveDrivePoseEst2_InterpRecord_New.vi					
X	X		X				SwerveDrivePoseEst2_New.vi					
X	X	X	X	SI			SwerveDrivePoseEst2_Pack_Config.vi					
X	X		X	SI			SwerveDrivePoseEst2_ResetPosition.vi					
X	X		X	SI			SwerveDrivePoseEst2_SetVisionMeasurementStdDevs.vi					
X	X		X				SwerveDrivePoseEst2_Update.vi					
X	X		X				SwerveDrivePoseEst2_UpdateWithTime.vi					

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UNSCENTED KALMAN FILTER	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
	X	X		X				UnscentedKalmanFilter_Correct_FuncGroup.vi					
	X	X		X				UnscentedKalmanFilter_Correct_OnlyUY.vi					
	X	X		X				UnscentedKalmanFilter_Correct_OnlyUYR.vi					
	X	X		X				UnscentedKalmanFilter_Correct.vi					
	X	X		X				UnscentedKalmanFilter_GetP_Single.vi					
	X	X		X				UnscentedKalmanFilter_GetP.vi					
	X	X		X				UnscentedKalmanFilter_GetXHat_Single.vi					
	X	X		X				UnscentedKalmanFilter_GetXHat.vi					
	X	X		X				UnscentedKalmanFilter_New_Default.vi					
	X	X		X				UnscentedKalmanFilter_New_FuncGroup.vi					
	X	X		X				UnscentedKalmanFilter_New.vi					
	X	X		X				UnscentedKalmanFilter_Predict.vi					
	X	X		X				UnscentedKalmanFilter_Reset.vi					
	X	X		X				UnscentedKalmanFilter_SetP.vi					
	X	X		X				UnscentedKalmanFilter_SetXHat_Single.vi					
	X	X		X				UnscentedKalmanFilter_SetXHat.vi					
	X	X		X				UnscentedKalmanFilter_Transform.vi					
STATE SPACE CONTROL													
CONTROL AFFINE PLANT INVERSION FEEDFORWARD	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
DIFFERENTIAL DRIVE ACCELERATION LIMITER	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
	X	X		X		X		DiffDrvAccelLimit_Calculate.vi					
	X	X		X		X		DiffDrvAccelLimit_New.vi					
IMPLICIT MODEL FOLLOWER	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
	X	X		X		X		ImplModelFollow_Calculate.vi					
	X	X		X		X		ImplModelFollow_GetU.vi					
	X	X		X		X		ImplModelFollow_GetU_Single.vi					
	X	X		X		X		ImplModelFollow_New.vi					
	X	X		X		X		ImplModelFollow_New_Plant.vi					
	X	X		X		X		ImplModelFollow_Reset.vi					

	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking	
LINEAR PLANT INVERSION FEEDFORWARD	X	X		X				LinearPIntInvFF_Calculate_NextR.vi						x
	X	X		X				LinearPIntInvFF_Calculate.vi						x
	X	X		X				LinearPIntInvFF_GetR_Single.vi						x
	X	X		X				LinearPIntInvFF_GetR.vi						x
	X	X		X				LinearPIntInvFF_GetUff_Single.vi						x
	X	X		X				LinearPIntInvFF_GetUff.vi						x
	X	X		X				LinearPIntInvFF_New_Plant.vi						x
	X	X		X				LinearPIntInvFF_New.vi						x
	X	X		X				LinearPIntInvFF_Reset_Initial.vi						x
	X	X		X				LinearPIntInvFF_Reset_Zero.vi						x
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	Implemented	Documented	Not WPI/LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking	
LINEAR SYSTEM LOOP	X	X		X				LinearSystemLoop_ClampInput.vi						x
	X	X		X				LinearSystemLoop_Correct.vi						x
	X			X				LinearSystemLoop_DCMotor_Execute.vi						x
	X	X	X	X	SI			LinearSystemLoop_DCMotor_Pack_Ctrl.vi						x
	X		X	X				LinearSystemLoop_DiffDrv_Execute.vi						x
	X		X	X				LinearSystemLoop_DiffDrv_Pack_Ctrl.vi						x
	X		X	X				LinearSystemLoop_Elevator_Execute.vi						x
	X		X	X				LinearSystemLoop_Elevator_Pack_Ctrl.vi						x
	X		X	X				LinearSystemLoop_Execute.vi						x
	X		X	X				LinearSystemLoop_FlyWheel_Execute.vi						x
	X		X	X				LinearSystemLoop_FlyWheel_Pack_Ctrl.vi						x
								LinearSystemLoop_GetClampFunction.vi						x
	X	X		X				LinearSystemLoop_GetController.vi						x
	X	X		X				LinearSystemLoop_GetError_Single.vi						x
	X	X		X				LinearSystemLoop_GetError.vi						x
	X	X		X				LinearSystemLoop_GetFeedForward.vi						x
	X	X		X				LinearSystemLoop_GetNextR_Single.vi						x
	X	X		X				LinearSystemLoop_GetNextR.vi						x
	X	X		X				LinearSystemLoop_GetObserver.vi						x
	X	X		X				LinearSystemLoop_GetU_Row.vi						x
	X	X		X				LinearSystemLoop_GetU.vi						x
	X	X		X				LinearSystemLoop_GetXHat_Single.vi						x
	X	X		X				LinearSystemLoop_GetXHat.vi						x
								LinearSystemLoop_New_BBB						x
								LinearSystemLoop_New_LinearSystem_ClampFunc						x
	X	X		X				LinearSystemLoop_New_LinearSystem_ClampVal.vi						x
	X	X		X				LinearSystemLoop_New.vi						x
	X		X	X				LinearSystemLoop_Pack_Ctrl_Params.vi						x
	X	X		X				LinearSystemLoop_Predict.vi						x
	X	X		X				LinearSystemLoop_Reset.vi						x
								LinearSystemLoop_SetClampFunction.vi						x
								LinearSystemLoop_SetNextR_Some.vi						x
	X	X		X				LinearSystemLoop_SetNextR.vi						x
								LinearSystemLoop_SetXHat_Single.vi						x
								LinearSystemLoop_SetXHat.vi						x
	X		X	X				LinearSystemLoop_SngJntArm_Execute.vi						x
	X		X	X				LinearSystemLoop_SngJntArm_Pack_Ctrl.VI						x
														x
														x
														x
														x
LTV DIFFERENTIAL DRIVE CONTROLLER	X	X		X				LTVDiffDriveCtrl_AtReference.vi						x
	X	X		X				LTVDiffDriveCtrl_Calculate_TrajState.vi						x
	X	X		X				LTVDiffDriveCtrl_Calculate.vi						x
	X		X	X				LTVDiffDriveCtrl_Execute.vi						x
	X	X		X				LTVDiffDriveCtrl_New.vi						x
	X		X	X				LTVDiffDriveCtrl_Pack_Ctrl_Params.vi						x
	X		X	X				LTVDiffDriveCtrl_Pack_Model_Params.vi						x
	X		X	X				LTVDiffDriveCtrl_Pack_Tolerance.vi						x
	X	X		X				LTVDiffDriveCtrl_SetTolerance.vi						x
	X		X	X				LTVUnicycleCtrl_Execute_TrajState.vi						x
														x

LTV UNICYCLE CONTROLLER	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
	X	X		X		X		LTVUnicycleCtrl_AtReference.vi					
	X	X		X		X		LTVUnicycleCtrl_Calculate_TrajState.vi					
	X	X		X		X		LTVUnicycleCtrl_Calculate.vi					
	X		X	X				LTVUnicycleCtrl_Execute.vi					
	X		X	X				LTVUnicycleCtrl_Execute_TrajState.vi					
	X	X		X		X		LTVUnicycleCtrl_New.vi					
	X		X	X				LTVUnicycleCtrl_Pack_Model_Params.vi					
	X		X	X				LTVUnicycleCtrl_Pack_Tolerance.vi					
	X	X		X		X		LTVUnicycleCtrl_SetEnabled.vi					
X	X		X		X		LTVUnicycleCtrl_SetTolerance.vi						
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STATE SPACE UTILITIES													
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CALLBACK HELPER	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
	X	X	X	X				CallbackHelp_MatrixMinus.vi					
	X	X	X	X				CallbackHelp_MatrixMult_CoerceSizeB.vi					
	X	X	X	X				CallbackHelp_MatrixMult.vi					
	X	X	X	X				CallbackHelp_MatrixPlus.vi					
DISCRETIZATION	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
	X	X		X		X		Discretization_DiscretizeA.vi					
	X	X		X		X		Discretization_DiscretizeAB.vi					
	X	X		X		X		Discretization_DiscretizeABTaylor.vi					
	X	X		X		X		Discretization_DiscretizeAQ.vi					
	X	X		X		X		Discretization_DiscretizeAQTaylor.vi					
	X	X		X				Discretization_DiscretizeR.vi					
STATE SPACE UTIL	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
	X	X	X	No				StateSpaceUtil_Check_Stabalizable.vi		Internal routine			
	X	X		X				StateSpaceUtil_ClampInputMaxMagnitude.vi		Routine exists, it is just a shell			
	X	X		X				StateSpaceUtil_IsDetectable.vi					
	X	X		X				StateSpaceUtil_IsStabalizable.vi					
	X	X		X		X		StateSpaceUtil_MakeCostMatrix.vi					
	X	X		X		X		StateSpaceUtil_MakeCovarianceMatrix.vi					
	X	X		X				StateSpaceUtil_MakeWhiteNoiseVector.vi					
	X	X		X				StateSpaceUtil_NomalizeInputVector.vi					
	X	X		X				StateSpaceUtil_PoseTo3dVector.vi					
	X	X		X				StateSpaceUtil_PoseTo4dVector.vi					
	X	X		X				StateSpaceUtil_PoseToVector.vi					

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SIMULATION

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	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
BATTERY SIM	X	X		X	S/			BatterySim_CalculateDefaultBatteryLoadedVoltage.vi					
	X	X		X	S/			BatterySim_CalculateLoadedVoltage.vi					
	X		X	X				BatterySim_Execute.vi					
DC MOTOR SIM	X		X	X				DCMotorSim_Execute.vi					
	X	X		X				DCMotorSim_getAngularPositionRad.vi					
	X	X		X				DCMotorSim_getAngularPositionRotations.vi					
	X	X		X				DCMotorSim_getAngularVelocityRadPerSec.vi					
	X	X		X				DCMotorSim_getAngularVelocityRPM.vi					
	X	X		X				DCMotorSim_GetCurrentDrawAmps.vi					
	X	X		X				DCMotorSim_New_MOI.vi					
	X	X		X				DCMotorSim_New_Plant.vi					
	X		X	X				DCMotorSim_Pack_Simulation_Params.vi					
	X	X		X				DCMotorSim_SetInputVoltage.vi					
	X	X		X				DCMotorSim_Update.vi					
DIFFERENTIAL DRIVE TRAIN SIM	X	X		X				DiffDriveTrainSim_ClampInput.vi					
	X	X		X				DiffDriveTrainSim_CreateKitbotSim_EstMass.vi					
	X	X		X				DiffDriveTrainSim_CreateKitbotSim_EstMassMOI.vi					
	X	X		X				DiffDriveTrainSim_CreateKitbotSim.vi					
	X		X	X				DiffDriveTrainSim_Execute.vi					
	X	X		X				DiffDriveTrainSim_GetCurrentDrawAmps.vi					
	X	X		X				DiffDriveTrainSim_GetCurrentGearing.vi					
	X	X		X				DiffDriveTrainSim_GetDynamics.vi					
	X	X		X				DiffDriveTrainSim_GetHeading.vi					
	X	X		X				DiffDriveTrainSim_GetLeftCurrentDrawAmps.vi					
	X	X		X				DiffDriveTrainSim_GetLeftPositionMeters.vi					
	X	X		X				DiffDriveTrainSim_GetLeftVelocityMetersPerSecond.vi					
	X	X		X				DiffDriveTrainSim_GetOutput_Single.vi					
	X	X		X				DiffDriveTrainSim_GetPose.vi					
	X	X		X				DiffDriveTrainSim_GetRightCurrentDrawAmps.vi					
	X	X		X				DiffDriveTrainSim_GetRightPositionMeters.vi					
	X	X		X				DiffDriveTrainSim_GetRightVelocityMetersPerSecond.vi					
	X	X		X				DiffDriveTrainSim_GetState_Single.vi					
	X	X		X				DiffDriveTrainSim_GetState.vi					
	X	X		X				DiffDriveTrainSim_KitBotWheelSize.vi					
	X	X		X				DiffDriveTrainSim_New_Mass_MOI.vi					
	X	X		X				DiffDriveTrainSim_New.vi					
	X		X	X				DiffDriveTrainSim_Pack_Model_Params.vi					
	X		X	X				DiffDriveTrainSim_Pack_Simulation_Params.vi					
	X	X		X				DiffDriveTrainSim_SetCurrentGearing.vi					
	X	X		X				DiffDriveTrainSim_SetInputs.vi					
	X	X		X				DiffDriveTrainSim_SetPose.vi					

X	X		X				DiffDriveTrainSim_SetState.vi					
X	X		X				DiffDriveTrainSim_ToughBoxMiniGearRatio.vi					
X	X		X				DiffDriveTrainSim_ToughBoxMiniMotor.vi					
X	X		X				DiffDriveTrainSim_Update.vi					

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	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
ELEVATOR SIM	X		X	X				ElevatorSim_Execute.vi					
	X	X		X				ElevatorSim_GetCurrentDraw.vi					
	X	X		X				ElevatorSim_GetPositionMeters.vi					
	X	X		X				ElevatorSim_GetVelocityMetersPerSecond.vi					
	X	X		X				ElevatorSim_HasHitLowerLimit.vi					
	X	X		X				ElevatorSim_HasHitUpperLimit.vi					
								ElevatorSim_New_LinSys_NoNoise.vi					
								ElevatorSim_New_LinSys.vi					
								ElevatorSim_New_NoNoise.vi					
	X	X		X				ElevatorSim_New.vi					
	X		X	X				ElevatorSim_Pack_Simulation_Params.vi					
	X	X	X	No				ElevatorSim_RKF45_Func.vi					
	X	X		X				ElevatorSim_SetInputVoltage.vi					
	X	X		X				ElevatorSim_SetState.vi					
	X	X	X	X				ElevatorSim_Update.vi		Needed because this doesn't extend.			
	X	X		X				ElevatorSim_UpdateX.vi					
	X	X		X				ElevatorSim_WouldHitLowerLimit.vi					
	X	X		X				ElevatorSim_WouldHitUpperLimit.vi					

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	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
FLYWHEEL SIM	X		X	X				FlyWheelSim_Execute.vi					
	X	X		X				FlyWheelSim_GetAngularVelocityRadPerSec.vi					
	X	X		X				FlyWheelSim_GetAngularVelocityRPM.vi					
	X	X		X				FlyWheelSim_GetCurrentDrawAmps					
								FlyWheelSim_New_LinSys		Future			
								FlyWheelSim_New_LinSys_MOI_NoNoise		Future			
								FlyWheelSim_New_LinSys_NoNoise		Future			
	X	X		X				FlyWheelSim_New_MOI.vi					
			X					FlyWheelSim_Pack_Simulation_Params.vi					
	X	X		X				FlyWheelSim_SetInput.vi					
	X	X		X				FlyWheelSim_SetState.vi					
	X	X		X				FlyWheelSim_Update.vi					

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	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
LINEAR SYSTEM SIM	X	X		X				LinearSystemSim_ClampInput.vi					
								LinearSystemSim_GetCurrentDrawAmps.vi		DONT IMPLEMENT...			
	X	X		X				LinearSystemSim_GetOutput_Single.vi					
	X	X		X				LinearSystemSim_GetOutput.vi					
	X	X		X				LinearSystemSim_New					
								LinearSystemSim_New_NoNoise.vi					
	X	X		X				LinearSystemSim_SetInput_Array.vi		Doesn't use clamp ?			
	X	X		X				LinearSystemSim_SetInput_Single.vi					
	X	X		X				LinearSystemSim_SetInput.vi					
	X	X		X				LinearSystemSim_Setstate.vi					

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X	X		X			LinearSystemSim_Update.vi							
X	X		No			LinearSystemSim_UpdateX.vi							
X	X	X	No			LinearSystemSim_UpdateY.vi							

	Implemented	Documented	Not WP/LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
SINGLE JOINT ARM SIM	X	X		X				SngJntArmSim_EsitmateMOI.vi					
	X		X	X				SngJntArmSim_Execute.vi					
	X	X		X				SngJntArmSim_GetAngleRads.vi					
	X	X		X				SngJntArmSim_GetCurrentDraw.vi					
	X	X		X				SngJntArmSim_GetVelocityRadsPerSec.vi					
	X	X		X				SngJntArmSim_HasHitLowerLimit.vi					
	X	X		X				SngJntArmSim_HasHitUpperLimit.vi					
	X	X		X				SngJntArmSim_New.vi					
	X		X	X				SngJntArmSim_Pack_Simulation_Params.vi					
	X	X		No				SngJntArmSim_Rkf45_Func.vi					
	X	X		X				SngJntArmSim_SetInputVoltage.vi					
	X	X		X				SngJntArmSim_SetState.vi					
	X	X		X				SngJntArmSim_Update.vi					
	X	X		X				SngJntArmSim_UpdateX.vi					
	X	X		X				SngJntArmSim_WouldHitLowerLimit.vi					
X	X		X				SngJntArmSim_WouldHitUpperLimit.vi						

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'=====
MATRIX UTILITIES
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MAT BUILDER	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
	X	X		X	5/			MatBuilder_Create.vi					
	X	X		X	5/			MatBuilder_Fill.vi					

MATRIX	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
	X	X		X	SI			Matrix_AssignBlock.vi					
	X	X		X	SI			Matrix_Block.vi					
								Matrix_ChangeBoundsUnchecked.vi					
	X	X		X	SI			Matrix_Create.vi					
								Matrix_Det.vi					
	X	X		X	SI			Matrix_Diag.vi					
								Matrix_Div_Scalar.vi		labview has function			
								Matrix_ElementPower.vi					
	X	X		X	SI			Matrix_ElementSum.vi					
								Matrix_ElementTimes.vi					
								Matrix_Equals.vi					
	X	X		X	I			Matrix_Exp.vi					
	X	X		X	SI			Matrix_ExtractColumnVector.vi					
	X	X		X	SI			Matrix_ExtractFrom.vi					
								Matrix_ExtractMatrix.vi					
	X	X		X	SI			Matrix_ExtractRowVector.vi					
	X	X		X	SI			Matrix_Fill.vi					
								Matrix_Get.vi		labview has function			
	X	X		X	I			Matrix_Ident.vi		WPILIB calls this EYE			
								Matrix_Inv.vi					

X	X		X	SI			Matrix_IsEqual.vi					
							Matrix_IsIdentical.vi					
X	X		X	I			Matrix_LLTDecompose.vi					
							Matrix_Max.vi					
							Matrix_MaxAbs.vi					
							Matrix_Mean.vi					
							Matrix_MinInternal.vi					
							Matrix_Minus_Matrix.vi					
							Matrix_Minus_Scalar.vi					
X	X		X	I			Matrix_NormF.vi					
							Matrix_NormIndP1.vi					
							Matrix_Plus_Matrix.vi					
							Matrix_Plus_Scalar.vi					
X	X		X	I			Matrix_Pow.vi		THIS NEEDS WORK!!!!			
X	X		X	SI			Matrix_SetColumn.vi					
X	X		X	SI			Matrix_SetRow.vi	THERE ARE LOTS OF OTHER MATRIX FUNCTIONS THAT SHOULD BE INCLUDED HERE FOR ISOLATION.				
							Matrix_Solve.vi					
							Matrix_Times_Matrix.vi					
							Matrix_Times_Scalar.vi					
							Matrix_Trace.vi					
X	X		X	SI			Matrix_Transpose.vi					
X	X	X	X				Matrix_WithinTolerance.vi					

	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
SIMPLE MATRIX	X	X		X	SI			SimpleMatrix_ExtractMatrix.vi		NOTE Matrix also has an ExtractMatrix with different calling parameters.... YUK.			

	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
MATRIX HELPER	X	X	X	X	SI			MatrixHelper_CooerceSize.vi					
	X	X	X	X	SI			MatrixHelper_MultCooerceBSize.vi					
	X	X	X	X	SI			MatrixHelper_Zero.vi					

	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
VECTOR BUILDER	X	X		X	SI			VecBuilder_1x1Fill.vi					
	X	X		X	SI			VecBuilder_2x1Fill.vi					
	X	X		X	SI			VecBuilder_3x1Fill.vi					
	X	X		X	SI			VecBuilder_4x1Fill.vi					
	X	X		X	SI			VecBuilder_5x1Fill.vi					
	X	X		X	SI			VecBuilder_6x1Fill.vi					
	X	X		X	SI			VecBuilder_7x1Fill.vi					
	X	X		X	SI			VecBuilder_8x1Fill.vi					
								VecBuilder_9x1Fill.vi					
								VecBuilder_10x1Fill.vi					
	X	X	X	X	SI			VecBuilder_ArrayBy1Fill.vi					

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MATH

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VECTOR	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking	x
	X	X		X	SI			Vector_Dot.vi						x
	X	X		X	SI			Vector_Norm.vi						x
														x
ANGLE STATISTICS	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking	x
	X	X	X	X	X			AngleStats_AngleAdd_CallbackHelp.vi						x
	X	X		X	I	X		AngleStats_AngleAdd.vi						x
	X	X	X	X	X			AngleStats_AngleMean_CallbackHelp.vi						x
	X	X		X	I	X		AngleStats_AngleMean.vi						x
	X	X	X	X	X			AngleStats_AngleResidual_CallbackHelp.vi						x
	X	X		X	I	X		AngleStats_AngleResidual.vi						x
														x
MATH UTILITY	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking	x
	X	X		X	SI			MathUtil_AngleModulus.vi						x
	X	X		X	SI			MathUtil_ApplyDeadband.vi						x
	X	X		X	SI			MathUtil_Clamp_Int.vi						x
	X	X		X	SI			MathUtil_Clamp.vi						x
	X	X		X	SI			MathUtil_InputModulus.vi						x
	X	X		X	SI			MathUtil_Interpolate.vi						x
														x
MERWE SCALED SIGMA POINTS	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking	x
	X	X		X	I			MerweScSigPts_ComputeWeights.vi						x
	X	X		X	SI			MerweScSigPts_GetNumSigmas.vi						x
	X	X		X	SI			MerweScSigPts_GetWc_Single.vi						x
	X	X		X	SI			MerweScSigPts_GetWc.vi						x
	X	X		X	SI			MerweScSigPts_GetWm_Single.vi						x
	X	X		X	SI			MerweScSigPts_GetWm.vi						x
	X	X		X	I			MerweScSigPts_New_Default.vi						x
	X	X		X	I			MerweScSigPts_New.vi						x
	X	X		X	I			MerweScSigPts_SigmaPoints.vi						x
	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking	x
														x
														x
														x

NUMERICAL INTEGRATION

X	X		X	I			NumIntegrate_Func_Ax_Bu_K.vi		NOT USED. Should this be used or abandoned???			
X	X		X				NumIntegrate_Rk4_Dbl_X_U.vi					
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					
X	X		No	SI			NumIntegrate_Rkdp_Func_B1B2.vi					
X	X		No	SI			NumIntegrate_Rkdp_Func_B2.vi					
X	X		No	I			NumIntegrate_Rkdp_Impl.vi					
X	X		X				NumIntegrate_RKDP_Mat_X_U.vi		New replacement for RKF45			
X	X		No	SI			NumIntegrate_Rkf45_Func_A.vi					
X	X		No	SI			NumIntegrate_Rkf45_Func_B1.vi					
X	X		No	SI			NumIntegrate_Rkf45_Func_B1B2.vi					
X	X		No	SI			NumIntegrate_Rkf45_Func_B2.vi					
							NumIntegrate_RKf45_Func_Bs.vi		Removed. Replaced with newer functions.			
							NumIntegrate_RKf45_Func_Ch.vi		Removed. Replaced with newer functions.			
							NumIntegrate_RKf45_Func_Ct.vi		Removed. Replaced with newer functions.			
X	X		No	I			NumIntegrate_Rkf45_Impl.vi					
X	X		X				NumIntegrate_Rkf45_Mat_X_U.vi		Note that this Feinberg method has been changed and a Dormand Price method has been implemented.... TODO			
							NumIntegrate_RKf45_New.vi		Removed. Never used.			
X	X	X	X	SI			NumIntegrate_Trap_Dbl.vi					
X	X	X	X	I			NumIntegrate_Trap_Mat.vi					

RUNGE KUTTA TIME VARYING

Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
X	X		No				RungeKuttaTimeVarying_RK4_Mat_T_Y.vi					

NUMERICAL JACOBIAN

Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
X	X		X				NumJacobian_U.vi					
X	X		X				NumJacobian_X.vi					

RICCATI

Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
X	X		X				Riccati_Check_Detectable.vi		Routine exists, it is just a shell			
X	X		X				Riccati_Check_Stabilizable.vi		Not really done !!!			
							Riccati_DARE_Choose.vi		Intended to allow DARE method testing.			
X	X	X	X		X		Riccati_DARE_Iterate.vi					
X	X	X	X		X		Riccati_DARE_StructDoubling.vi					
X	X		X				Riccati_DARE_N.vi					
X	X		X		X		Riccati_DARE.vi					
X	X		X				Riccati_Input_Check.vi					

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VISION

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COMPUTER VISION UTILITIES	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
	X	X		X				CompVisionUtil_CalculateDistanceToTarget.vi					
	X	X		X				CompVisionUtil_EstimateCameraToTarget.vi					
	X	X		X				CompVisionUtil_EstimateFieldToCamera.vi					
	X	X		X				CompVisionUtil_EstimateFieldToRobot.vi					
	X	X		X				CompVisionUtil_EstimateFieldToRobot_Alt.vi					
	X	X		X				CompVisionUtil_ObjectToRobotPose.vi					

APRIL TAG	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
	X	X		X	SI			AprilTag_Equals.vi					
	X	X	X	X	SI			AprilTag_GetAll.vi					
	X	X		X	SI			AprilTag_New.vi					

APRIL TAG FIELD LAYOUT	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
	X	X		X	SI			AprilTagFieldLayout_GetField.vi					
	X	X		X	SI			AprilTagFieldLayout_GetOriginPosition.vi					
	X	X		X	SI			AprilTagFieldLayout_GetTagPose.vi					
	X	X		X	SI			AprilTagFieldLayout_GetTags.vi					
	X	X		X	SI			AprilTagFieldLayout_New.vi					
	X	X		X	SI			AprilTagFieldLayout_New2022.vi					
	X	X		X	SI			AprilTagFieldLayout_New2023.vi					
	X	X		X	SI			AprilTagFieldLayout_NewSelect.vi					
	X	X		X	SI			AprilTagFieldLayout_SetOrigin.vi					
	X	X		X	SI			AprilTagFieldLayout_SetOrigin_Position.vi					

APRIL TAG POSE ESTIMATE	Implemented	Documented	Not WPI LIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
	X	X		X	SI			AprilTagPoseEstimate_GetAll.vi					
	X	X		X	SI			AprilTagPoseEstimate_GetAmbiguity.vi					
	X	X		X	SI			AprilTagPoseEstimate_New.vi					

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COMMUNICATIONS

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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	
NETWORK UDP	X	X	X	X	S/			NetworkUDP_Close.vi						x
	X	X	X	X	/			NetworkUDP_Receive.vi						x
	X	X	X	X	/			NetworkUDP_Send.vi						x
														x

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TYPE DEFINITIONS

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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	
TypeDef	Z	Z	X	X	N/A			AprilTag.ctf						x
	Z	Z	X	X	N/A			AprilTagFieldLayout.ctf						x
	Z	Z	X	X	N/A			AprilTagFieldLayoutOriginPosition_ENUM.ctf						x
	Z	Z	X	X	N/A			AprilTagFields_ENUM.ctf						x
	Z	Z	X	X	N/A			AprilTagPoseEstimate.ctf						x
	Z	Z	X	X	N/A			ARM_FF.CTL						x
	Z	Z	X	X	N/A			BANG_BANG.CTL						x
	\		X	X	N/A			BICon-Matrix_FUNC_TYPE.CTL		NOT USED. Should this be deleted or abandoned???				x
	Z	Z	X	X	N/A			CALLBACK_FUNC_TYPE.CTL						x
	Z	Z	X	X	N/A			CHASSIS_SPEEDS.CTL						x
	Z	Z	X	X	N/A			CONSTRAINED_STATE.CTL						x
	Z	Z	X	X	N/A			COORDINATE_AXIS.CTL						x
	Z	Z	X	X	N/A			COORDINATE_SYSTEM.CTL						x
	Z	Z	X	X	N/A			DCMOTOR_SIM.CTL						x
	/		/		/			DCMOTOR_SIM_MODEL_PARAMS.CTL		OBSOLETE – Removed				x
	Z		Z	X	N/A			DCMOTOR_SIM_SIMULATION_PARAMS.CTL						x
	Z	Z	X	X	N/A			DCMOTOR_TYPES_ENUM.CTL						x
	Z	Z	X	X	N/A			DCMOTOR.CTL						x
	Z	Z	X	X	N/A			DEBOUNCER_TYPE_ENUM.ctf						x
	Z	Z	X	X	N/A			DEBOUNCER.CTL						x
	Z	Z	X	X	N/A			DIFF_DRIVE_ACCEL_LIMIT.CTL						x
	Z	Z	X	X	N/A			DIFF_DRIVE_KINEMATICS.CTL						x
	Z	Z	X	X	N/A			DIFF_DRIVE_Kitbot_WheelSize_ENUM.ctf						x
	Z	Z	X	X	N/A			DIFF_DRIVE_ODOM2.ctf						x
	Z	Z	X	X	N/A			DIFF_DRIVE_Pose_EST.ctf						x
	Z	Z	X	X	N/A			DIFF_DRIVE_POSE_EST2.ctf						x
	Z	Z	X	X	N/A			DIFF_DRIVE_POSE_EST2_CONFIG.CTL						x
	Z	Z	X	No	N/A			DIFF_DRIVE_POSE_EST2_INTERP_RECORD.CTL						x
	Z	Z	X	X	N/A			DIFF_DRIVE_ToughBoxMini_GearChoice_ENUM.ctf						x
	Z	Z	X	X	N/A			DIFF_DRIVE_ToughBoxMini_MotorChoice_ENUM.ctf						x
	Z		Z	X	N/A			DIFF_DRIVE_SIM_MODEL_PARAMS						x
	Z		Z	X	N/A			DIFF_DRIVE_SIM_SIMULATION_PARAMS.CTL						x
	Z	Z	X	X	N/A			DIFF_DRIVE_TRAIN_SIM_STATE_ENUM.CTL						x
	Z	Z	X	X	N/A			DIFF_DRIVE_TRAIN_SIM.ctf						x
	Z	Z	X	X	N/A			DISPLAY_WAYPOINT.ctf		Was UTIL_WAYPOINT.VI				x
	Z	Z	X	X	NA			DISPLAY_WEIGHTED_WAYPOINT.ctf		New V1.5. was UTIL_WEIGHTED_WAYPOINT.VI				x
	Z	Z	X	X	N/A			ELEV_FF.CTL						x
	Z	Z	X	X	N/A			ELEVATOR_SIM.CTL						x
	Z		Z	X	N/A			ELEVATOR_SIM_SIMULATION_PARAMS.CTL						x
	Z	Z	X	X	N/A			EXTENDED_KALMAN_CORRECT_FUNC_GROUP.CTL						x
	Z		X	X	N/A			EXTENDED_KALMAN_FILTER.CTL						x
	Z	Z	X	X	N/A			FLYWHEEL_SIM.ctf						x
	Z		Z	X	N/A			FLYWHEEL_SIM_SIMULATION_PARAMS.CTL						x
	Z	Z	X	X	N/A			FUNCTION_GENERATOR_MATRIX.ctf						x

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Revision 3.05 3/01/2023 – Added execute routines for state space sim and ctrl

Z	Z	X	X	N/A	FUNCTION_GENERATOR.ctf			
Z	Z	X	X	N/A	HOLONOMIC_DRV_CTRL.CTL		New 1/26/21	
Z	Z	X	X	N/A	KALMAN_FILTER_LATENCY_COMP_FUNC_GROUP.CTL			
Z	Z	X	X	N/A	KALMAN_FILTER_LATENCY_COMP.CTL			
Z	Z	X	X	N/A	KALMAN_FILTER.ctf			
Z	Z	X	X	N/A	LINEAR_FILTER.CTL			
Z	Z	X	X	N/A	LINEAR_PLANT_INV_FF.ctf			
Z	Z	X	X	N/A	LINEAR_QUADRATIC_REGULATOR.ctf			
Z		Z	X	N/A	LINEAR_SYSTEM_ID_DCMOTOR_MODEL.CTL			
Z		Z	X	N/A	LINEAR_SYSTEM_ID_ELEVATOR_MODEL.CTL			
Z		Z	X	N/A	LINEAR_SYSTEM_ID_FLYWHEEL_MODEL.CTL			
Z		Z	X	N/A	LINEAR_SYSTEM_ID_SINGLE_JOINT_ARM_MODEL.CTL			
Z	Z	X	X	N/A	LINEAR_SYSTEM_LOOP.ctf			
Z		Z	X	N/A	LINEAR_SYSTEM_LOOP_CTRL_PARAMS.CTL			
Z		Z	X	N/A	LINEAR_SYSTEM_LOOP_DCMOTOR_CTRL_PARAMS.CL			
Z		Z	X	N/A	LINEAR_SYSTEM_LOOP_DIFF_DRV_CTRL_PARAMS.CTL			
Z		Z	X	N/A	LINEAR_SYSTEM_LOOP_ELEVATOR_CTRL_PARAMS.CTL			
Z		Z	X	N/A	LINEAR_SYSTEM_LOOP_FLYWHEEL_CTRL_PARAMS.CTL			
Z		Z	X	N/A	LINEAR_SYSTEM_LOOP_SNGJNTARM_CTRL_PARAMS.CTL			
Z	Z	X	X	N/A	LINEAR_SYSTEM_SIM.ctf			
Z	Z	X	X	N/A	LINEAR_SYSTEM.ctf			
Z		Z	X	N/A	LTV_DIFF_DRIVE_CTRL_CONTROL_PARAMS.CTL			
Z		Z	X	N/A	LTV_DIFF_DRIVE_CTRL_MODEL_PARAMS.CTL			
Z	Z	X	X	N/A	LTV_DIFF_DRIVE_CTRL_STATE_ENUM.ctf			
Z		Z	X	N/A	LTV_DIFF_DRIVE_CTRL_TOLERANCE.CTL			
Z	Z	X	X	N/A	LTV_DIFF_DRIVE_CTRL.ctf			
Z		Z	X	N/A	LTV_UNICYCLE_CONTROLLER_MODEL_PARAMS.CTL			
Z	Z	X	X	N/A	LTV_UNICYCLE_CONTROLLER_STATE_ENUM.ctf			
Z		Z	X	N/A	LTV_UNICYCLE_CONTROLLER_TOLERANCE.CTL			
Z	Z	X	X	N/A	LTV_UNICYCLE_CONTROLLER.CTL			
Z	Z	X	X	N/A	MECA_DRIVE_KINEMATICS.CTL			
Z	Z	X	X	N/A	MECA_DRIVE_ODOMETRY.CTL			
Z	Z	X	X	N/A	MECA_DRIVE_POSE_EST.CTL			
Z	Z	X	X	N/A	MECA_DRIVE_POSE_EST2.ctf			
Z	Z	X	X	N/A	MECA_DRIVE_POSE_EST2_CONFIG.CTL			
Z		X	X	N/A	MECA_DRIVE_POSE_EST2_INTERP_RECORD.CTL			
Z	Z	X	X	N/A	MECA_WHEEL_POSITIONS.CTL			
Z	Z	X	X	N/A	MECA_WHEEL_SPEEDS.CTL			
Z	Z	X	X	N/A	MEDIAN_FILTER.CTL			
Z	Z	X	X	N/A	MERWE_SCALED_SIGMA_PTS.ctf			
Z	Z	X	X	N/A	OBSERVER_SNAP_LIST_ITEM.CTL			
Z	Z	X	X	N/A	OBSERVER_SNAPSHOT.CTL			
Z	Z	X	X	N/A	PARAM_STACK_ITEM.CTL			
Z	Z	X	X	N/A	PARAM_STACK.CTL			
Z	Z	X	X	N/A	PID_ADV_LIMITS.CTL			
Z	Z	X	X	N/A	PID_ADV_TUNING.CTL			
Z	Z	X	X	N/A	PID_CONTROLLER.CTL			
Z	Z	X	X	N/A	PID_ERROR_TOLERANCE.CTL			
Z	Z	X	X	N/A	PID_INPUT_LIMITS.CTL			
Z	Z	X	X	N/A	PID_TUNING.CTL			
Z	Z	X	X	N/A	POSE2D.CTL			
Z	Z	X	X	N/A	POSE3D.CTL			
Z	Z	X	X	N/A	POSEwCURVATURE.CTL			
Z	Z	X	X	N/A	PROFILED_PID_CONTROLLER.CTL			
Z	Z	X	X	N/A	QUATERNION.CTL			
Z	Z	X	X	N/A	RAMSETE_EXE_TUNING.CTL			
Z	Z	X	X	N/A	RAMSETE.CTL			
Z	Z	X	X	N/A	ROTATION2D.CTL			
Z	Z	X	X	N/A	ROTATION3D.CTL			
Z	Z	Z	X	N/A	SIMPLE_MOTOR_FF_KA_TUNE_PARAMS.CTL			
Z	Z	X	X	N/A	SIMPLE_MOTOR_FF.CTL			
Z	Z	X	X	N/A	SINGLE_JOINT_ARM_SIM.CTL			
Z		X	X	N/A	SINGLE_JOINT_ARM_SIM_SIMULATION_PARAMS.CTL			
Z	Z	X	X	N/A	SLEW_RATE_LIMITER.CTL			
Z	Z	X	X	N/A	SPLINE_CTRL_VECTOR.CTL			
Z	Z	X	X	N/A	SPLINE.CTL			
Z	Z	X	X	N/A	SWERVE_DRIVE_KINEMATICS.CTL			
Z	Z	X	X	N/A	SWERVE_DRIVE_MODULE_POSITION.CTL			
Z	Z	X	X	N/A	SWERVE_DRIVE_MODULE_STATE.CTL			
Z	Z	X	X	N/A	SWERVE_DRIVE_ODOMETRY.CTL			
Z	Z	X	X	N/A	SWERVE_DRIVE_Pose_EST.CTL			

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Z		X	X	N/A	SWERVE_DRIVE_POSE_EST2.ctf		
Z	Z	X	X	N/A	SWERVE_DRIVE_POSE_EST2_CONFIG.CTL		
Z		X	No	N/A	SWERVE_DRIVE_POSE_EST2_INTERP_RECORD.CTL		
Z	Z	X	X	N/A	TIME_INTERPOLATABLE_BOOLEAN.CTL		
Z	Z	X	X	N/A	TIME_INTERPOLATABLE_DOUBLE.CTL		
Z	Z	X	X	N/A	TIME_INTERPOLATABLE_POSE2D.CTL		
Z	Z	X	X	N/A	TIME_INTERPOLATABLE_ROTATION2D.CTL		
Z	Z	Z	X	N/A	TIME_INTERPOLATABLE_VARIANT.CTL		
Z	Z	X	X	N/A	TIMER.CTL		
Z	Z	X	X	N/A	TRAJ_CONFIG.CTL		
Z	Z	X	X	N/A	TRAJ_CONSTRAINT_CENTRIPETAL_ACCEL.CTL		
Z	Z	X	X	N/A	TRAJ_CONSTRAINT_DIIF_DRIVE_KINEMATICS.CTL		
Z	Z	X	X	N/A	TRAJ_CONSTRAINT_DIIF_DRIVE_VOLTAGE.CTL		
Z	Z	X	X	N/A	TRAJ_CONSTRAINT_ELLIP_REGION.CTL		
I		X		N/A	TRAJ_CONSTRAINT_JERK.CTL		Routine exists, it is just a shell
Z	Z	X	X	N/A	TRAJ_CONSTRAINT_MAX_VELOCITY.CTL		
Z	Z	X	X	N/A	TRAJ_CONSTRAINT_MECA_DRIVE_KINEMATICS.CTL		
Z	Z	X	X	N/A	TRAJ_CONSTRAINT_MINMAX.CTL		
Z	Z	X	X	N/A	TRAJ_CONSTRAINT_RECT_REGION.CTL		
Z	Z	X	X	N/A	TRAJ_CONSTRAINT_SWERVE_DRIVE_KINEMATICS.CTL		
Z	Z	X	X	N/A	TRAJ_STATE.CTL		
Z	Z	X	X	N/A	TRAJECTORY_SPLINE_TYPE_ENUM.CTL		
Z	Z	X	X	N/A	TRAJECTORY.CTL		
Z	Z	X	X	N/A	TRANSFORM2D.CTL		
Z	Z	X	X	N/A	TRANSFORM3D.CTL		
Z	Z	X	X	N/A	TRANSLATION2D.CTL		
Z	Z	X	X	N/A	TRANSLATION3D.CTL		
Z	Z	X	X	N/A	TRAPEZOID_PROFILE_CONSTRAINT.CTL		
Z	Z	X	X	N/A	TRAPEZOID_PROFILE_STATE.CTL		
Z	Z	X	X	N/A	TRAPEZOID_PROFILE.CTL		
Z	Z	X	X	N/A	TWIST2D.CTL		
Z	Z	X	X	N/A	TWIST3D.CTL		
Z	Z	X	X	N/A	UNSCENTED_KALMAN_CORRECT_FUNC_GROUP.CTL		
Z	Z	X	X	N/A	UNSCENTED_KALMAN_FILTER.ctf		
Z	Z	X	X	N/A	UNSCENTED_KALMAN_NEW_FUNC_GROUP.CTL		
Z	Z	X	X	N/A	UTIL_PATHFINDER_CONFIG.CTL		
N/A		N/A		N/A	WAYPOINTS.CTL		Delete – obsolete
Z	Z	X	X	NA	WEIGHTED_WAYPOINT.CTL		New V1.5
N/A		N/A		N/A	X_Y_HEADINGS.CTL		Delete – obsolete
Z	Z	X	X	N/A	X_Y_PAIR.CTL		

[illegible]