FRC LabVIEW Trajectory Library – VI Implementation List

Revision 2.X   12/07/2021 – Added Bang/Bang – (not very useful)

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	823	823	248	781	436	26	12
VI Total (X)	738						
CTL Total (Z)	85						
VI Shell Total (/)	5						
CTRL Shell Total (\)	2						

Doc completed Pct
100.00%

Optimization Pct
52.98%

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

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

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
LINEAR FILTER	X	X		X	I			LinearFilter_BackwardFiniteDifference.vi		
	X	X		X	SI			LinearFilter_Calculate.vi		
	X	X	X	X	X			LinearFilter_CutoffFrequency.vi		
	X	X	X	X	I		X	LinearFilter_Execute.vi		Labview style helper
	X	X		No	I			LinearFilter_Factorial.vi		AN INTERNAL ROUTINE
	X	X		X	X			LinearFilter_HighPass.vi		
	X	X	X	X	X			LinearFilter_HighPassBW1.vi		
	X	X	X	X	X			LinearFilter_HighPassBW2.vi		
	X	X	X	X	X			LinearFilter_LowPassBW1.vi		
	X	X	X	X	X			LinearFilter_LowPassBW2.vi		
	X	X		X	X			LinearFilter_MovingAverage.vi		
	X	X		X	I			LinearFilter_New.vi		
	X	X		X	SI			LinearFilter_Reset.vi		
	X	X	X	X	SI			LinearFilter_ResetToValue.vi		
	X	X		X	X			LinearFilter_SinglePoleIIR.vi		
	X	X	X	X	X			LinearFilter_TimeConst.vi		

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
MEDIAN FILTER	X	X		X	X			MedianFilter_Calculate.vi		
	X	X	X	X	I		X	MedianFilter_Execute.vi		Labview style helper
	X	X		X	SI			MedianFilter_New.vi		
	X	X		X	SI			MedianFilter_Reset.vi		
	X	X	X	X	SI			MedianFilter_ResetToValue.vi		

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
SLEW RATE FILTER	X	X		X	I			SlewRateLimiter_Calculate.vi		
	X	X	X	X	SI			SlewRateLimiter_Close.vi		
	X	X	X	X	I		X	SlewRateLimiter_Execute.vi		Labview style helper
	X	X	X	X	SI			SlewRateLimiter_GetRate.vi		
	X	X		X	I			SlewRateLimiter_New.vi		
	X	X		X	I			SlewRateLimiter_NewInitialZero.vi		
	X	X		X	I			SlewRateLimiter_Reset.vi		
	X	X		X	SI			SlewRateLimiter_SetRate.vi		

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
TIMER	X	X	X	X				Timer_Close.vi		releases semaphore
	X	X		X			X	Timer_Get.vi		
	X	X	X	X				Timer_GetAndReset.vi		
	X	X	X	No				Timer_GetInternal.vi		Internal (private) only
	X	X		X			X	Timer_HasPeriodPassed.vi		
	X	X	X	X			X	Timer_HasPeriodPassedOnce.vi		
	X	X		X			X	Timer_New.vi		
	X	X		X			X	Timer_Reset.vi		
	X	X	X	No				Timer_ResetInternal		Internal (private) only
	X	X		X			X	Timer_Start.vi		
	X	X		X			X	Timer_Stop.vi		
	X	X	X	No				Timer_StopInternal.vi		Internal (private) only

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
DIG SEQ LOGIC	X	X	X	X				DigSeqLogic_On_Delay.vi		
	X	X	X	X				DigSeqLogic_Off_Delay.vi		
	X	X	X	X				DigSeqLogic_One_Shot.vi		
	X	X	X	X				DigSeqLogic_SR_Flip_Flop.vi		

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
DEBOUNCER	X	X		X				Debouncer_New.vi		
	X	X		X				Debouncer_Calculate.vi		
	X	X	X	X				Debouncer_Execute.vi		
	X	X		No				Debouncer_Reset.vi		
	X	X		No				Debouncer_HasElapsed.vi		

'============
CONTROLLER
'============

ARM FF

Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
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
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
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
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		

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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 WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
X	X		X	SI			HolDrvCtrl_AtReference.vi		Added 1/26/21
X	X		X	I			HolDrvCtrl_Calculate_Trajectory.vi		Added 1/26/21
X	X		X	I			HolDrvCtrl_Calculate.vi		Added 1/26/21
		X					HolDrvCtrl_Execute_Trajectory.vi		Future
		X					HolDrvCtrl_Execute.vi		Future
X	X		X	SI			HolDrvCtrl_New.vi		Added 1/26/21
X	X		X	SI			HolDrvCtrl_SetEnabled.vi		Added 1/26/21
X	X		X	SI			HolDrvCtrl_SetTolerance.vi		Added 1/26/21

PID CONTROLLER

Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
X	X	X	X				PIDController_AdvCalculate_FF_Sp_Pv_Per.vi		Advanced PID
X	X	X	X				PIDController_AdvCalculate_FF_Sp_Pv.vi		Advanced PID
X	X	X	X			X	PIDController_AdvExecute.vi		Labview style helper. Advanced PID
X	X		X	SI			PIDController_AtSetpoint.vi		
X	X		X				PIDController_Calculate_PV.vi		
X	X		X				PIDController_Calculate_SP_PV.vi		
X	X		X	SI			PIDController_DisableContinousInput.vi		
X	X		X	SI			PIDController_EnableContinousInput.vi		
X	X	X	X			X	PIDController_Execute.vi		Labview style helper
							PIDController_GetContinuousError.vi		OBSOLETE – Removed
X	X		X	SI			PIDController_GetPeriod.vi		
X	X		X	SI			PIDController_GetPID.vi		
X	X		X	SI			PIDController_GetPositionError.vi		
X	X		X	SI			PIDController_GetSetpoint.vi		
X	X		X	SI			PIDController_GetVelocityError.vi		
X	X		X	SI			PIDController_IsContinuousInputEnabled.vi		
X	X		X	I			PIDController_New.vi		
X	X		X	I			PIDController_NewPeriod.vi		
X	X	X	X	SI			PIDController_Pack_AdvLimits.vi		
X	X	X	X	SI			PIDController_Pack_AdvTuning.vi		
X	X	X	X	SI			PIDController_Pack_ErrorTolerance.vi		
X	X	X	X	SI			PIDController_Pack_InputLimits.vi		
X	X	X	X	SI			PIDController_Pack_Tuning.vi		
X	X		X	SI			PIDController_Reset.vi		
X	X		X	SI			PIDController_SetD.vi		
X	X	X	X	SI			PIDController_SetDerivativeFilter.vi		Advanced PID
X	X	X	No				PIDController_SetFeedForward_OBSOLETE_DELETE.vi		Advanced PID, Obsolete – DELETE
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

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Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
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		

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
PROFILED PID CONTROLLER	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_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		

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
RAMSETE	X	X		X	SI			Ramsete_AtReference.vi	AtReference	
	X	X		X	X			Ramsete_Calculate_Trajectory.vi	calculate_trajectory	
	X	X		X	X			Ramsete_Calculate.vi	calculate	
	X	X	X	X	X			Ramsete_Diff_DO_Eng.vi		
	X	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	

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Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
X	X		X	SI			Ramsete_SetTolerance.vi	SetTolerance	
X	X		X	X			Ramsete_SINC.vi	sinc	internal

SIMPLE MOTOR FEEDFORWARD

Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
X	X	X	X	SI			SimpleMotorFF_Calculate_CalcAccel.vi		
X	X		X				SimpleMotorFF_Calculate_NextV_Dt.vi		
X	X		X	SI			SimpleMotorFF_Calculate.vi	public double calculate(double velocity, double acceleration)	
X	X		X	SI			SimpleMotorFF_CalculateVelocityOnly.vi	public double calculate(double velocity)	
X	X		X	X			SimpleMotorFF_MaxAchieveAccel.vi	public double maxAchievableAcceleration(double maxVoltage, double velocity)	
X	X		X	X			SimpleMotorFF_MaxAchieveVel.vi	public double maxAchievableVelocity(double maxVoltage, double acceleration)	
X	X		X	X			SimpleMotorFF_MinAchieveAccel.vi	public double minAchievableAcceleration(double maxVoltage, double velocity)	
X	X		X	X			SimpleMotorFF_MinAchieveVel.vi	public double minAchievableVelocity(double maxVoltage, double acceleration)	
X	X		X	SI			SimpleMotorFF_New.vi	public SimpleMotorFeedforward(double ks, double kv, double ka)	
								public SimpleMotorFeedforward(double ks, double kv)	

'===========
GEOMETRY
'===========

POSE

Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
X	X		X	SI			Pose_Equals.VI	boolean equals(other obj)	
X	X		X	X			Pose_Exp.vi	pose2d exp(twist2d twist)	
X	X		X	SI			Pose_getRotation.vi	rotation2d getRotation()	can also use cluster unpack
X	X		X	SI			Pose_getTranslation.vi	translation2d getTranslation()	can also use cluster unpack
X	X	X	X	SI			Pose_getXY.vi		
X	X	X	X	SI			Pose_getXYAngle.vi		
X	X		X	I			Pose_Interpolate.vi		
X	X		X	X			Pose_Log.vi	twist2d log(pose2d end)	
X	X		X	SI			Pose_Minus.vi	transform2d minus(pose2d other)	
X	X		X	SI			Pose_New_TRRO.vi	pose2d new(translation2d, rotation2d)	
X	X		X	SI			Pose_New.vi	pose2d new(double x, double y, rotation2d)	
X	X		X	SI			Pose_Plus.vi	pose2d plus(transform2d other)	
X	X		X	SI			Pose_RelativeTo.vi	pose2d relativeto(pose2d other)	
X	X		X	SI			Pose_TransformBy.vi	pose2d transformby(transform2d other)	
								pose2d new( )	can use cluster constant

ROTATION

Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
X	X		X	SI			Rotation_CreateAngle.vi	rotation2d new(double value)	
X	X		X	SI			Rotation_CreateAngleDegrees.vi	rotation2d fromDegrees(double degrees)	convert to radians then create
X	X		X	SI			Rotation_CreateXY.vi	rotation2d new(double x, double y)	
X	X		X	SI			Rotation_Equals.vi	boolean equals(rotation2d other)	
X	X	X	X	SI			Rotation_GetAngleCosSin.vi		New 1/26/21

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Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
X	X		X	SI			Rotation_GetCos.VI	double getCos()	use cluster unpack
X	X		X	SI			Rotation_GetDegrees.VI	double getDegrees()	use cluster unpack, then convert to degree
X	X		X	SI			Rotation_GetRadians.VI	double getRadians()	use cluster unpack
X	X		X	SI			Rotation_GetSin.VI	double getSin()	use cluster unpack
X	X		X	SI			Rotation_GetTan.VI	double getTan()	can calculate
X	X		X	SI			Rotation_Interpolate.vi		
X	X		X	SI			Rotation_Minus.vi	rotation2d minus(rotation2d other)	
X	X		X	SI			Rotation_Plus.vi	rotation2d plus(rotation2d other)	
X	X		X	SI			Rotation_RotateBy.vi	rotation2d rotateby(rotation2d other)	
X	X		X	SI			Rotation_Times.vi	rotation2d times(double scalar)	
X	X		X	SI			Rotation_UnaryMinus.vi	rotation2d unaryminus( )	
								rotation2d new()	can use cluster constant

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
TRANSFORM	X	X		X	SI			Transform_Create_PosePose.vi	transform2d new(pose2d, pose2d)	
	X	X		X	SI			Transform_Create_TransRot.vi	transform2d new(translation2d, rotation2d)	
	X	X		X	SI			Transform_Equals.VI	boolean equals(other transform2d)	
	X	X		X	SI			Transform_GetRotation.VI	rotation2d getRotation()	use cluster unpack
	X	X		X	SI			Transform_GetTranslation.VI	translation2d getTranslation()	use cluster unpack
	X	X	X	X	SI			Transform_GetXY.vi		
	X	X	X	X	SI			Transform_GetXYAngle.vi		
	X	X		X	SI			Transform_Inverse.vi	transform inverse()	new
	X	X		X	Si			Transform_Plus.vi		
	X	X		X	SI			Transform_Times.vi	transform2d times(double scalar)	
									transform2d new( )	can use cluster constant

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
TRANSLATION	X	X		X	SI			Translation_Create_DistAng.vi		
	X	X		X	SI			Translation_Create.vi	translation2d new(double x, double y)	
	X	X		X	SI			Translation_Equals.vi	boolean equals(translation other)	
	X	X		X	SI			Translation_GetDistance.vi	double getDistance(translation2d other)	
	X	X		X	SI			Translation_GetNorm.VI	double getNorm()	can use cluster unpack
	X	X		X	SI			Translation_GetX.VI	double getX()	can use cluster unpack
	X	X	X	X	SI			Translation_GetXY.VI		
	X	X		X	SI			Translation_GetY.VI	double getY()	can use cluster unpack
	X	X		X	SI			Translation_Interpolate.vi		
	X	X		X	SI			Translation_Minus.vi	translation2d minus(translation2d other)	
	X	X		X	SI			Translation_Plus.vi	translation2d plus(translation2d other)	
	X	X		X	SI			Translation_RotateBy.vi	translation2d rotateBy(rotation2d other)	
	X	X		X	SI			Translation_Times.vi	translation2d times(double scalar)	
	X	X		X	SI			Translation_UnaryMinus.vi	translation2d unaryminus( )	
									translation2d new()	can use cluster constant
									translation2d div(double scalar)	can multiply by 1/scalar

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	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
TWIST	X	X		X	SI			Twist_Create.vi	twist new(x, y, theta)	
	X	X		X	SI			Twist_Equals.VI	boolean equals(obj other)	
	X	X	X	X	SI			Twist_GetAll.VI		

'===========
KINEMATICS
'===========

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
CHASSIS SPEEDS	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

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
DIFFERENTIAL DRIVE KINEMATICS	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	X		DiffKinematics_toWheelSpeed.vi	diffDriveWheelSpeed toWheelSpeeds(chassisSpeeds)	

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
DIFFERENTIAL DRIVE ODOMETRY			X					DiffOdometry_Execute.vi		DONT NEED
	X	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()	

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
DIFFERENTIAL DRIVE WHEEL SPEEDS									diffDrWheelSpeeds new()	
									diffDrWheelSpeeds new(double leftVel, double rightVel)	
	X	X		X	X			DiffWheel_Normalize.vi	void normalize(double maxVel)	

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	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
MECANUM DRIVE KINEMATICS	X	X		X	I			MecaKinematics_New.vi		
	X	X		X	X			MecaKinematics_SetInverseKinematics.vi		
	X	X		X	X			MecaKinematics_ToChassisSpeeds.vi		
	X	X		X	X			MecaKinematics_ToWheelSpeeds.vi		
	X	X		X	X			MecaKinematics_ToWheelSpeedsZeroCenter.vi		

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
MECANUM DRIVE MOTOR VOLTAGE										
nothing done										

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
MECANUM DRIVE ODOMETRY			X					MecaOdometry_Execute.vi		
	X	X		X				MecaOdometry_GetPose.vi		
	X	X		X				MecaOdometry_New.vi		
	X	X		X				MecaOdometry_NewDefaultPose.vi		
	X	X		X				MecaOdometry_Reset.VI		
	X	X		X				MecaOdometry_Update.vi		
	X	X		X				MecaOdometry_UpdateWithTime.vi		

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
MECANUM DRIVE WHEEL SPEEDS	X	X		X	SI			MecaWheel_New.Vi	public MecanumDriveWheelSpeeds(double frontLeftMetersPerSecond, double frontRightMetersPerSecond, double rearLeftMetersPerSecond, double rearRightMetersPerSecond)	
	X	X		X	X			MecaWheel_Normalize.vi	public void normalize(double attainableMaxSpeedMetersPerSecond)	

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
SWERVE DRIVE KINEMATICS	X	X	X	X				SwerveKinematics_New4.VI		For 4 module drives
	X	X	X	X				SwerveKinematics_NewX.VI		uses array as input

Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
X	X	X	X				SwerveKinematics_NormalizeWheelSpeeds.vi	public static void normalizeWheelSpeeds(SwerveModuleState[] moduleStates, double attainableMaxSpeedMetersPerSecond)	
X	X	X	X				SwerveKinematics_ToChassisSpeeds4.VI		For 4 module drives
X	X	X	X				SwerveKinematics_ToChassisSpeedsX.VI		uses array as input
X	X		X				SwerveKinematics_ToSwerveModuleStates.VI	public SwerveModuleState[] toSwerveModuleStates(ChassisSpeeds chassisSpeeds, Translation2d centerOfRotationMeters)	
X	X		X				SwerveKinematics_ToSwerveModuleStatesZeroCenter.VI	public SwerveModuleState[] toSwerveModuleStates(ChassisSpeeds chassisSpeeds)	
								public SwerveDriveKinematics(Translation2d... wheelsMeters)	variable parameters (replace with array and "4" calls)
								public ChassisSpeeds toChassisSpeeds(SwerveModuleState... wheelStates)	variable parameters (replace with array and "4" calls)

Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
SWERVE DRIVE ODOMETRY							SwerveOdometry_Execute4.vi		
							SwerveOdometry_ExecuteX.vi		
X	X		X				SwerveOdometry_GetPosition.VI	public Pose2d getPoseMeters()	
X	X		X				SwerveOdometry_New.VI	public SwerveDriveOdometry(SwerveDriveKinematics kinematics, Rotation2d gyroAngle, Pose2d initialPose)	
X	X		X				SwerveOdometry_NewZeroCenter.VI	public SwerveDriveOdometry(SwerveDriveKinematics kinematics, Rotation2d gyroAngle)	
X	X		X				SwerveOdometry_ResetPosition.VI	public void resetPosition(Pose2d pose, Rotation2d gyroAngle)	
X	X	X	X				SwerveOdometry_Update4.VI		For 4 module drives
X	X	X	X				SwerveOdometry_UpdateWithTime4.VI		For 4 module drives
X	X	X	X				SwerveOdometry_UpdateWithTimeX.VI		uses array as input
X	X	X	X				SwerveOdometry_UpdateX.VI		uses array as input
								public Pose2d updateWithTime(double currentTimeSeconds, Rotation2d gyroAngle, SwerveModuleState... moduleStates)	variable parameters (replace with array and "4" calls)
								public Pose2d update(Rotation2d gyroAngle, SwerveModuleState... moduleStates)	variable parameters (replace with array and "4" calls)

Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
SWERVE DRIVE MODULE STATE	X	X		X	SI			SwerveModuleState_CompareTo.vi	public int compareTo(SwerveModuleState o)	
			X	SI			SwerveModuleState_Get.vi		
X	X		X	SI			SwerveModuleState_New.vi	public SwerveModuleState(double speedMetersPerSecond, Rotation2d angle)	
X	X		X	SI			SwerveModuleState_Optimize.vi	public SwerveModuleState optimize(SwerveModuleState desired, Rotation2d angle)	

'============
SPLINE
'============

Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
CUBIC HERMITE SPLINE							`	protected SimpleMatrix getCoefficients()	not needed, use cluster unpack
X	X		X				CubicHermiteSpline_getControlVectorFromArrays.vi	private SimpleMatrix getControlVectorFromArrays(double[] initialVector, double[] finalVector)	
X	X		X				CubicHermiteSpline_makeHermiteBasis.vi	private SimpleMatrix makeHermiteBasis()	

Revision 2.X   12/07/2021 – Added Bang/Bang – (not very useful)

Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
X	X		X				CubicHermiteSpline_New.vi	public CubicHermiteSpline(double[] xInitialControlVector, double[] xFinalControlVector, double[] yInitialControlVector, double[] yFinalControlVector)	

POSE WITH CURVATURE

Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
X	X		X	SI			PoseWithCurve_New.vi	public PoseWithCurvature(Pose2d poseMeters, double curvatureRadPerMeter)	
								public PoseWithCurvature()	can use cluster constant
								public Pose2d poseMeters	not needed, use cluster unpack
								public double curvatureRadPerMeter..	not needed, use cluster unpack

QUINTIC HERMITE SPLINE

Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
X	X		X				QuinticHermiteSpline_getControlVectorFromArrays.vi	private SimpleMatrix getControlVectorFromArrays(double[] initialVector, double[] finalVector)	
X	X		X				QuinticHermiteSpline_makeHermiteBasis.vi	private SimpleMatrix makeHermiteBasis()	
X	X		X				QuinticHermiteSpline_New.vi	public QuinticHermiteSpline(double[] xInitialControlVector, double[] xFinalControlVector, double[] yInitialControlVector, double[] yFinalControlVector)	
								protected SimpleMatrix getCoefficients()	not needed, use cluster unpack

SPLINE (Abstract class)

Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
X	X		X				Spline_getPoint.vi	public PoseWithCurvature getPoint(double t)	
								Spline(int degree)	
								public static class ControlVector	
								public ControlVector(double[] x, double[] y)	implemented as data structure

SPLINE HELPER

Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
X	X		X	SI			SplineHelp_GetCubicCtrlVector.vi	private static Spline.ControlVector getCubicControlVector(double scalar, Pose2d point)	
X	X		X		X		SplineHelp_GetCubicCtrlVectorsFromWayPts.vi	public static Spline.ControlVector[] getCubicControlVectorsFromWaypoints(Pose2d start, Translation2d[] interiorWaypoints, Pose2d end)	
X	X	X	X				SplineHelp_GetCubicCtrlVectorsFromWeightedWayPts.vi		
X	X	X	No				SplineHelp_GetCubicSpline_Calc1.vi		internal
X	X	X	No				SplineHelp_GetCubicSpline_Calc2.vi		internal
X	X	X	No				SplineHelp_GetCubicSpline_Calc3.vi		internal
X	X		X		X		SplineHelp_getCubicSplinesFromControlVectors.vi	public static CubicHermiteSpline[] getCubicSplinesFromControlVectors(Spline.ControlVector start, Translation2d[] waypoints, Spline.ControlVector end)	
X	X		X	SI			SplineHelp_GetQuinticCtrlVector.vi	private static Spline.ControlVector getQuinticControlVector(double scalar, Pose2d point)	

Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
X	X		X				SplineHelp_GetQuinticCtrlVectorsFromWayPts.vi	public static List<Spline.ControlVector> getQuinticControlVectorsFromWaypoints(List<Pose2d> waypoints)	
X	X	X	X				SplineHelp_GetQuinticCtrlVectorsFromWeightedWayPts.vi		
X	X		X				SplineHelp_getQuinticSplinesFromControlVectors.vi	public static QuinticHermiteSpline[] getQuinticSplinesFromControlVectors(Spline.ControlVector[] controlVectors)	
X	X		No				SplineHelp_ThomasAlgorithm.vi	private static void thomasAlgorithm(double[] a, double[] b, double[] c, double[] d, double[] solutionVector)	internal

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
SPLINE PARAMETERIZER	X	X		X				SplineParam_Spline_T0_T1.vi	public static List<PoseWithCurvature> parameterize(Spline spline, double t0, double t1)	
	X	X		X		X		SplineParam_Spline.vi	public static List<PoseWithCurvature> parameterize(Spline spline)	
	X	X	X	No				SplineParam_StackGet.vi		internal
	X	X	X	No				SplineParam_StackPop.vi		internal
	X	X	X	No				SplineParam_StackPush.vi		internal

'===========
TRAJECTORY
'===========

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
TRAJECTORY	X	X		X	yellow	yellow		Trajectory_Concatenate.vi		
	X	X		X				Trajectory_equals.vi	boolean equals(other obj)	FUTURE
	X	X		X	SI			Trajectory_GetStates.vi	public List<State> getStates()	not needed, use unpack
	X	X		X	SI			Trajectory_GetTotalTime.vi	public double getTotalTimeSeconds()	not needed, use unpack
	X	X		No	SI			Trajectory_lerp_double.vi	private static double lerp(double startValue, double endValue, double t)	internal
	X	X		No	SI			Trajectory_lerp_Pose.vi	private static Pose2d lerp(Pose2d startValue, Pose2d endValue, double t)	internal
	X	X		X	SI			Trajectory_New_Empty.vi		
	X	X		X	SI			Trajectory_New.vi	public Trajectory(final List<State> states)	
	X	X		X				Trajectory_RelativeTo.vi	public Trajectory relativeTo(Pose2d pose)	
	X	X		X	yellow			Trajectory_Sample.vi	public State sample(double timeSeconds)	
	X	X	X	X	yellow			Trajectory_SampleReverse.vi		Sample in reverse order. Negate sample.
	X	X		X	yellow			Trajectory_TransformBy.vi	public Trajectory transformBy(Transform2d transform)	
	yellow								public Pose2d getInitialPose()	can use cluster unpack, array index

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
TRAJECTORY_STATE	X	X		X	SI			TrajectoryState_Equals.vi	boolean equals(other obj)	
	X	X	X	X	SI			TrajectoryState_GetAll.vi		
	X	X		X	SI			TrajectoryState_GetPose.vi		
	X	X		X	yellow			TrajectoryState_Interpolate.vi	State interpolate(State endValue, double i)	

Revision 2.X   12/07/2021 – Added Bang/Bang – (not very useful)

Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
X	X		X	SI			TrajectoryState_New.vi	public State(double timeSeconds, double velocityMetersPerSecond, double accelerationMetersPerSecondSq, Pose2d poseMeters, double curvatureRadPerMeter)	
								public State()	

TRAJECTORY CONFIG

Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
X	X		X	SI			TrajectoryConfig_Create.vi	public TrajectoryConfig(double maxVelocityMetersPerSecond, double maxAccelerationMetersPerSecondSq)	
X	X	X	X	SI			TrajectoryConfig_setCentripetalAccel.vi		
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		X	SI			TrajectoryConfig_setKinematicsSwerveDrive.vi	public TrajectoryConfig setKinematics(SwerveDriveKinematics kinematics)	
X	X		X	SI			TrajectoryConfig_setReversed.vi	public TrajectoryConfig setReversed(boolean reversed)	
X	X	X	X	SI			TrajectoryConfig_setVoltageDiffDrive.vi		
								public TrajectoryConfig addConstraint(TrajectoryConstraint constraint)	Implemented differently, can't duplicate.
								public TrajectoryConfig addConstraints(List<? extends TrajectoryConstraint> constraints)	Implemented differently, can't duplicate.
								public double getStartVelocity()	can use cluster unpack
								public TrajectoryConfig setStartVelocity(double startVelocityMetersPerSecond)	
								public double getEndVelocity()	can use cluster unpack
								public TrajectoryConfig setEndVelocity(double endVelocityMetersPerSecond)	
								public double getMaxVelocity()	can use cluster unpack
								public double getMaxAcceleration()	can use cluster unpack
								public List<TrajectoryConstraint> getConstraints()	Implemented differently, can't duplicate.
								public boolean isReversed()	can use cluster unpack

NOTE ADD OTHER "SET" ROUTINES FOR OTHER CONTRAINTS HERE, SINCE NEW CONTRAINTS ARE SPECIFIC AND NOT GENERIC.

TRAJECTORY GENERATE

Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
X	X		X				TrajectoryGenerate_Make_Cubic_CtrlVect.vi	public static Trajectory generateTrajectory(Spline.ControlVector initial, List<Translation2d> interiorWaypoints, Spline.ControlVector end, TrajectoryConfig config)	uses cubic splines
X	X		X				TrajectoryGenerate_Make_Cubic.vi	public static Trajectory generateTrajectory(Pose2d start, List<Translation2d> interiorWaypoints, Pose2d end, TrajectoryConfig config)	uses cubic splines
X	X	X	X				TrajectoryGenerate_Make_Generic.vi	Helper to bring these all together….	Use this one!!!
X	X		X				TrajectoryGenerate_Make_Quintic_CtrlVect.vi	public static Trajectory generateTrajectory(ControlVectorList controlVectors, TrajectoryConfig config)	uses quintic splines
X	X		X				TrajectoryGenerate_Make_Quintic.vi	public static Trajectory generateTrajectory(List<Pose2d> waypoints, TrajectoryConfig config)	uses quintic splines
X	X		X				TrajectoryGenerate_splinePointsFromSplines.vi	public static List<PoseWithCurvature> splinePointsFromSplines(Spline[] splines)	

Revision 2.X   12/07/2021 – Added Bang/Bang – (not very useful)

TRAJECTORY GENERATE (Control Vector)

Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
								public ControlVectorList(int initialCapacity)	may not need, just data
								public ControlVectorList()	may not need, just data
								public ControlVectorList(Collection<? extends Spline.ControlVector> collection)	may not need, just data

TRAJECTORY PARAMETERIZE

Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
X	X	X	No				TrajectoryParam_calcStuffFwd.vi		
X	X	X	No				TrajectoryParam_calcStuffRev.vi		
X	X		No				TrajectoryParam_enforceAccel.vi	private static void enforceAccelerationLimits(boolean reverse, List<TrajectoryConstraint> constraints, ConstrainedState state)	This routines needs to be changed when new constraints are added.
X	X	X	No				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)	

TRAJECTORY PARAMETERIZE CONSTRAINED STATE

Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
X	X		X				ConstrainedState_New.vi	ConstrainedState(PoseWithCurvature pose, double distanceMeters, double maxVelocityMetersPerSecond, double minAccelerationMetersPerSecondSq, double maxAccelerationMetersPerSecondSq)	
X	X	X	X				ConstrainedState_SetMaxAccel.vi		
X	X	X	X				ConstrainedState_SetMinAccel.vi		
X	X	X	X				ConstrainedState_SetVelAccel.vi		
X	X	X	X				ConstrainedState_SetVelocity.vi		
								ConstrainedState()	

TRAJECTORY UTIL

Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
X	X		X				TrajectoryUtil_fromPathWeaverJSON.vi	public static Trajectory fromPathweaverJson(Path path)	
X	X	X	X	X			TrajectoryUtil_MakeWeightedWayPoint_ENG.vi		
X	X	X	X	X			TrajectoryUtil_MakeWeightedWayPoint.vi		
X	X		X				TrajectoryUtil_toPathWeaverJSON.vi	public static void toPathweaverJson(Trajectory trajectory, Path path)	
								public static Trajectory deserializeTrajectory(String json)	
								public static String serializeTrajectory(Trajectory trajectory)	

Revision 2.X   12/07/2021 – Added Bang/Bang – (not very useful)

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
TRAPEZOID PROFILE	X	X		X				TrapProfConstraint_New.vi		
	X	X		X				TrapProfile_Calculate.vi		
	X	X		No				TrapProfile_Direct.vi		Private, remove from menu
	X	X	X	X				TrapProfile_Execute.vi		
	X	X	X	X	SI			TrapProfile_Execute_AtGoal.vi		
	X	X		X				TrapProfile_IsFinished.vi		
	X	X		X				TrapProfile_New_DefInitial.vi		
	X	X		X				TrapProfile_New.vi		
	X	X		No				TrapProfile_ShouldFlipAcceleration.vi		Private, remove from menu
	X	X		X				TrapProfile_TimeLeftUntil.vi		
	X	X		X				TrapProfile_TotalTime.vi		
	X	X		X				TrapProfState_Equals.vi		
	X	X		X				TrapProfState_New.vi		

'============
TRAJECTORY CONSTRAINT
'============

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
CENTRIPETAL ACCELERATION CONSTRAINT	X	X		X				CentripetalAccelConstraint_getMaxVelocity.vi	public double getMaxVelocityMetersPerSecond(Pose2d poseMeters, double curvatureRadPerMeter, double velocityMetersPerSecond)	
	X	X		X				CentripetalAccelConstraint_getMinMaxAccel.vi	public MinMax getMinMaxAccelerationMetersPerSecondSq(Pose2d poseMeters, double curvatureRadPerMeter, double velocityMetersPerSecond)	
	X	X		X	SI			CentripetalAccelConstraint_New.vi	public CentripetalAccelerationConstraint(double maxCentripetalAccelerationMetersPerSecondSq)	Can use cluster pack for now

	Implemented	Documented	Not WPILIB	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)	

Revision 2.X   12/07/2021 – Added Bang/Bang – (not very useful)

	Implemented	Documented	Not WPILIB	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)	

	Implemented	Documented	Not WPILIB	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

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

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
SWERVE DRIVE KINEMATICS CONSTRAINT	X	X		X				SwerveDriveKinematicsConstraint_getMaxVelocity.vi	public double getMaxVelocityMetersPerSecond(Pose2d poseMeters, double curvatureRadPerMeter, double velocityMetersPerSecond)	
	X	X		X				SwerveDriveKinematicsConstraint_getMinMaxAccel.vi	public MinMax getMinMaxAccelerationMetersPerSecondSq(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

TRAJECTORY CONSTRAINT

Interface class - nothing done (not needed)

Revision 2.X   12/07/2021 – Added Bang/Bang – (not very useful)

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

'============
UTILITY
'============

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	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	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_Waypoint_Eng_To_SI.vi		
	X	X	X	X				Util_Waypoint_To_CubicInput.vi		
	X	X	X	X				Util_Waypoint_To_QuinticInput.vi		
	X	X	X	X				Util_WeightedWaypoint_Eng_To_WeightedWaypoint		
	X	X	X	No				Util_WeightedWayPoint_To_WeightedWayPoint.vi		Sorry about the confusing name..

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

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	X	X	X	X	SI			Conv_AngleDegrees_Heading.vi		

Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
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_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_POSE_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_Yards_Meters.vi		

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

'============
PATHFINDER UTIL
'============

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
PATHFINDERUTIL	X	X	X	X				PathfinderUtil_Continuous_Heading_Difference.vi		
	X	X	X	X				PathfinderUtil_OptimizeTrajectoryStates.vi		
	X	X	X	X				PathfinderUtil_ToTrajectory.vi		
	X	X	X	X				PathfinderUtil_ToTrajectoryStates.vi		

'============
STATE SPACE MODEL
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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
DC MOTOR	X	X		X	SI			DCMotor_GetAndymark9015.vi					

						VI Name	Function Prototype	Notes			
X	X		X	SI		DCMotor_GetAndymarkRs775_125.vi					
X	X		X	SI		DCMotor_GetBag.vi					
X	X		X	SI		DCMotor_GetBanebotsRs550.vi					
X	X		X	SI		DCMotor_GetBanebotsRs775.vi					
X	X		X	SI		DCMotor_GetCIM.vi					
X	X		X	SI		DCMotor_GetCurrent.vi					
X	X		X	SI		DCMotor_GetFalcon500.vi					
X	X		X	SI		DCMotor_GetMiniCIM.vi					
X	X		X	SI		DCMotor_GetNEO.vi					
X	X		X	SI		DCMotor_GetNEO550.vi					
X	X		X	SI		DCMotor_GetRomiBuiltIn.vi					
X	X		X	SI		DCMotor_GetVex775Pro.vi					
X	X		X	SI		DCMotor_New.vi					
X	X		X	SI		DCMotor_PickMotor.vi					

	Implemented	*Documented*	*Not WPILIB*	*Menu Item*	*Execution Optimized*	*Test Routine*	*Sample Program*	VI Name	Function Prototype	Notes	*Code Review*	*Test Program*	*Error Checking*
LINEAR SYSTEM ID	X	X		X				LinearSystemId_CreateDriveTrainVelocitySystem.vi		Update to use create matrix			
	X	X		X				LinearSystemId_CreateElevatorSystem.vi		Update to use create matrix			
	X	X		X				LinearSystemId_CreateFlywheelSystem.vi		Update to use create matrix			
	X	X		X				LinearSystemId_CreateSingleJointedArmSystem.vi		Update to use create matrix			
	X	X		X				LinearSystemId_IdentifyDriveTrainSystem.vi		Update to use create matrix			
	X	X		X				LinearSystemId_IdentifyPositionSystem.vi		Update to use create matrix			
	X	X		X				LinearSystemId_IdentifyVelocitySystem.vi		Update to use create matrix			

'============
STATE SPACE ESTIMATION
'============

	Implemented	*Documented*	*Not WPILIB*	*Menu Item*	*Execution Optimized*	*Test Routine*	*Sample Program*	VI Name	Function Prototype	Notes	*Code Review*	*Test Program*	*Error Checking*
DIFFERENTIAL DRIVE POSE ESTIMATOR	X	X		X				DiffDrivePoseEst_AddVisionMeasurement.vi					
	X	X		X				DiffDrivePoseEst_FillStateVector.vi					
	X	X		X				DiffDrivePoseEst_GetEstimatedPosition.vi					
	X	X		X				DiffDrivePoseEst_Kalman_F_Callback.vi					
	X	X		X				DiffDrivePoseEst_Kalman_H_Callback.vi					
	X	X		X				DiffDrivePoseEst_New.vi					
	X	X		X				DiffDrivePoseEst_ResetPosition.vi					
	X	X		X				DiffDrivePoseEst_SetVisionMeasurementStdDevs.vi					
	X	X		X				DiffDrivePoseEst_Update.vi					
	X	X		X				DiffDrivePoseEst_UpdateWithTime.vi					
	X	X		X				DiffDrivePoseEst_VisionCorrect_Callback.vi					
	X	X		X				DiffDrivePoseEst_VisionCorrect_Kalman_H_Callback.vi					

	Implemented	*Documented*	*Not WPILIB*	*Menu Item*	*Execution Optimized*	*Test Routine*	*Sample Program*	VI Name	Function Prototype	Notes	*Code Review*	*Test Program*	*Error Checking*

Revision 2.X   12/07/2021 – Added Bang/Bang – (not very useful)

	Implemented	Documented	Not WPILIB	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 WPILIB	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 WPILIB	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 WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
SWERVE DRIVE POSE ESTIMATOR	▨							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					

Revision 2.X   12/07/2021 – Added Bang/Bang – (not very useful)

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				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					

UNSCENTED KALMAN FILTER

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				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
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CONTROL AFFINE PLANT INVERSION FEEDFORWARD

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

LINEAR PLANT INVERSION FEEDFORWARD

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				LinearPlntInvFF_Calculate_NextR.vi					
X	X		X				LinearPlntInvFF_Calculate.vi					
X	X		X				LinearPlntInvFF_GetR_Single.vi					
X	X		X				LinearPlntInvFF_GetR.vi					
X	X		X				LinearPlntInvFF_GetUff_Single.vi					

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	(yellow)			LinearPlntInvFF_GetUff.vi					
X	X		X	(yellow)			LinearPlntInvFF_New_Plant.vi					
X	X		X	(yellow)			LinearPlntInvFF_New.vi					
X	X		X	(yellow)			LinearPlntInvFF_Reset_Initial.vi					
X	X		X	(yellow)			LinearPlntInvFF_Reset_Zero.vi					

LINEAR QUADRATIC REGULATOR

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	(yellow)			LinearQuadraticRegulator_Calculate_NextR.vi					
X	X		X	(yellow)			LinearQuadraticRegulator_Calculate.vi					
X	X		X	(yellow)			LinearQuadraticRegulator_GetK_Single.vi		NOT ORIGINAL…			
X	X		X	(yellow)	X		LinearQuadraticRegulator_GetK.vi					
X	X		X	(yellow)			LinearQuadraticRegulator_GetR_Single.vi					
X	X		X	(yellow)			LinearQuadraticRegulator_GetR.vi					
X	X		X	(yellow)			LinearQuadraticRegulator_GetU_Single.vi					
X	X		X	(yellow)			LinearQuadraticRegulator_GetU.vi					
/	X		X	(yellow)	X		LinearQuadraticRegulator_LatencyCompensate.vi		Routine exists, but it only has interger raise matrix to power.			
X	X		X	(yellow)			LinearQuadraticRegulator_New_ELMS.vi					
X	X		X	(yellow)			LinearQuadraticRegulator_New_N.vi					
(yellow)							LinearQuadraticRegulator_New_Raw.vi					
X	X		X	(yellow)	X		LinearQuadraticRegulator_New_SystemELMS.vi					
X	X		X	(yellow)			LinearQuadraticRegulator_New.vi					
X	X		X	(yellow)			LinearQuadraticRegulator_Reset.vi					

LINEAR SYSTEM

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	/ (green)			LinearSystem_CalculateX.vi					
X	X		X	/ (green)			LinearSystem_CalculateY.vi					
X	X		X	SI			LinearSystem_GetA.vi					
X	X		X	SI			LinearSystem_GetAElement.vi					
X	X		X	SI			LinearSystem_GetB.vi					
X	X		X	SI			LinearSystem_GetBElement.vi					
X	X		X	SI			LinearSystem_GetC.vi					
X	X		X	SI			LinearSystem_GetCElement.vi					
X	X		X	SI			LinearSystem_GetD.vi					
X	X		X	SI			LinearSystem_GetDElement.vi					
X	X		X	SI			LinearSystem_New.vi					

LINEAR SYSTEM LOOP

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	(yellow)			LinearSystemLoop_ClampInput.vi					
X	X		X	(yellow)			LinearSystemLoop_Correct.vi					
(yellow)							LinearSystemLoop_GetClampFunction.vi					

							VI Name
X	X		X				LinearSystemLoop_GetController.vi
X	X		X				LinearSystemLoop_GetError_Single.vi
X	X		X				LinearSystemLoop_GetError.vi
X	X		X				LinearSystemLoop_GetFeedForward.vi
X	X		X				LinearSystemLoop_GetNextR_Single.vi
X	X		X				LinearSystemLoop_GetNextR.vi
X	X		X				LinearSystemLoop_GetObserver.vi
X	X		X				LinearSystemLoop_GetU_Row.vi
X	X		X				LinearSystemLoop_GetU.vi
X	X		X				LinearSystemLoop_GetXHat_Single.vi
X	X		X				LinearSystemLoop_GetXHat.vi
							LinearSystemLoop_New_BBB
							LinearSystemLoop_New_LinearSystem_ClampFunc
X	X		X				LinearSystemLoop_New_LinearSystem_ClampVal.vi
X	X		X				LinearSystemLoop_New.vi
X	X		X				LinearSystemLoop_Predict.vi
X	X		X				LinearSystemLoop_Reset.vi
							LinearSystemLoop_SetClampFunction.vi
							LinearSystemLoop_SetNextR_Some.vi
X	X		X				LinearSystemLoop_SetNextR.vi
							LinearSystemLoop_SetXHat_Single.vi
							LinearSystemLoop_SetXHat.vi

'============
STATE SPACE UTILITIES
'============

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
CALLBACK HELPER	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					

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
DISCRETIZATION	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					

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

Revision 2.X   12/07/2021 – Added Bang/Bang – (not very useful)

STATE SPACE UTIL							VI Name		Notes			
	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					

'============
SIMULATION
'============

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
BATTERY SIM	X	X		X	SI			BatterySim_CalculateDefaultBatteryLoadedVoltage.vi					
	X	X		X	SI			BatterySim_CalculateLoadedVoltage.vi					

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
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_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_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					

ELEVATOR SIM

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	�回			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	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					

FLYWHEEL SIM

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	▩			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	X		X	▩			FlyWheelSim_SetInput.vi					
X	X		X	▩			FlyWheelSim_SetState.vi					
X	X		X	▩			FlyWheelSim_Update.vi					

LINEAR SYSTEM SIM

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	▩			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					
X	X		X	▩			LinearSystemSim_Update.vi					

	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			No			LinearSystemSim_UpdateX.vi					
	X	X	X		No			LinearSystemSim_UpdateY.vi					

	Implemented	Documented	Not WPILIB	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_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		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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	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
MAT BUILDER	X	X		X	SI			MatBuilder_Create.vi					
	X	X		X	SI			MatBuilder_Fill.vi					

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
MATRIX	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					

						VI Name	Function Prototype	Notes			
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					

	Implemented	Documented	Not WPILIB	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 WPILIB	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 WPILIB	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					

						VI Name			
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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	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
ANGLE STATISTICS	X	X	X	X	X			AngleStats_AngleAdd_CallbackHelp.vi					
	X	X		X	I	X		AngleStats_AngleAdd.vi					
	X	X	X	X	X			AngleStats_AngleMean_CallbackHelp.vi					
	X	X		X	I	X		AngleStats_AngleMean.vi					
	X	X	X	X	X			AngleStats_AngleResidual_CallbackHelp.vi					
	X	X		X	I	X		AngleStats_AngleResidual.vi					

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
MATH UTILITY	X	X		X	SI			MathUtil_AngleModulus.vi					
	X	X		X	SI			MathUtil_ApplyDeadband.vi					
	X	X		X	SI			MathUtil_Clamp_Int.vi					
	X	X		X	SI			MathUtil_Clamp.vi					
	X	X		X	SI			MathUtil_InputModulus.vi					
	X	X		X	Si			MathUtil_Interpolate.vi					

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
MERWE SCALED SIGMA POINTS	X	X		X	I			MerweScSigPts_ComputeWeights.vi					
	X	X		X	SI			MerweScSigPts_GetNumSigmas.vi					
	X	X		X	SI			MerweScSigPts_GetWc_Single.vi					
	X	X		X	SI			MerweScSigPts_GetWc.vi					
	X	X		X	SI			MerweScSigPts_GetWm_Single.vi					
	X	X		X	SI			MerweScSigPts_GetWm.vi					
	X	X		X	I			MerweScSigPts_New_Default.vi					
	X	X		X	I			MerweScSigPts_New.vi					
	X	X		X	I			MerweScSigPts_SigmaPoints.vi					

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
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_B2.vi					
	X	X		No	SI			NumIntegrate_Rkdp_Func_B1B2.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_Bs.vi					
	X	X		No	SI			NumIntegrate_RKf45_Func_Ch.vi					
	X	X		No	SI			NumIntegrate_RKf45_Func_Ct.vi					
	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		New for using new refactored values. Work In Progress…			
	X	X	X	X	SI			NumIntegrate_Trap_Dbl.vi					
	X	X	X	X	I			NumIntegrate_Trap_Mat.vi					

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
RUNGE KUTTA TIME VARYING	X	X		No				RungeKuttaTimeVarying_RK4_Mat_T_Y.vi					

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

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
RICCATI	X	X		X				Riccati_Check_Detectable.vi		Routine exists, it is just a shell			
	X	X		X				Riccati_Check_Stabilizable.vi		Not really done !!!			

Revision 2.X   12/07/2021 – Added Bang/Bang – (not very useful)

Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
X	X		X		X		Riccati_DARE_Iterate.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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TYPE DEFINITIONS
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	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
TypeDef	Z	X	X	X	N/A			ARM_FF.CTL		
	Z	X	X	X	N/A			BANG_BANG.CTL		
	\		X	X	N/A			BICon-Matrix_FUNC_TYPE.CTL		NOT USED. Should this be deleted or abandoned???
	Z	X	X	X	N/A			CALLBACK_FUNC_TYPE.CTL		
	Z	X	X	X	N/A			CHASSIS_SPEEDS.CTL		
	Z	X	X	X	N/A			CONTRAINED_STATE.CTL		
	Z	X	X	X	N/A			DCMOTOR_TYPES_ENUM.CTL		
	Z	X	X	X	N/A			DCMOTOR.CTL		
	Z	X	X	X	N/A			DEBOUNCER_TYPE_ENUM.Ctl		
	Z	X	X	X	N/A			DEBOUNCER.CTL		
	Z	X	X	X	N/A			DIFF_DRIVE_KINEMATICS.CTL		
	Z	X	X	X	N/A			DIFF_DRIVE_Kitbot_WheelSize_ENUM.ctl		
	Z	X	X	X	N/A			DiFF_DRIVE_POSE_EST.ctl		
	Z	X	X	X	N/A			DIFF_DRIVE_ToughBoxMini_GearChoice_ENUM.ctl		
	Z	X	X	X	N/A			DIFF_DRIVE_ToughBoxMini_MotorChoice_ENUM.ctl		
	Z	X		X	N/A			DIFF_DRIVE_TRAIN_SIM_STATE_ENUM.CTL		
	Z	X	X	X	N/A			DIFF_DRIVE_TRAIN_SIM.ctl		
	Z	X	X	X	NA			DISPLAY_WAYPOINT.ctl		Was UTIL_WAYPOINT.VI
	Z	X	X	X	NA			DISPLAY_WEIGHTED_WAYPOINT.ctl		New V1.5. was UTIL_WEIGHTED_WAYPOINIT.VI
	Z	X	X	X	N/A			ELEV_FF.CTL		
	Z	X	X	X	N/A			ELEVATOR_SIM.CTL		
	Z	X	X	X	N/A			EXTENDED_KALMAN_CORRECT_FUNC_GROUP.CTL		
	Z		X	X	N/A			ExTENDED_KALMAN_FILTER.CTL		
	Z	X	X	X	N/A			FLYWHEEL_SIM.ctl		
	Z	X	X	X	N/A			HOLONOMIC_DRV_CTRL.CTL		New 1/26/21
	Z	X	X	X	N/A			KALMAN_FILTER_LATENCY_COMP_FUNC_GROUP.CTL		
	Z	X	X	X	N/A			KALMAN_FILTER_LATENCY_COMP.CTL		
	Z	X	X	X	N/A			KALMAN_FILTER.ctl		
	Z	X	X	X	N/A			LINEAR_FILTER.CTL		
	Z	X	X	X	N/A			LINEAR_PLANT_INV_FF.ctl		
	Z	X	X	X	N/A			LINEAR_QUADRATIC_REGULATOR.ctl		
	Z	X	X	X	N/A			LINEAR_SYSTEM_LOOP.ctl		
	Z	X	X	X	N/A			LINEAR_SYSTEM_SIM.ctl		
	Z	X	X	X	N/A			LINEAR_SYSTEM.ctl		
	Z	X	X	X	N/A			MECA_DRIVE_KINEMATICS.CTL		
	Z	X	X	X	N/A			MECA_DRIVE_ODOMETRY.CTL		
	Z	X	X	X	N/A			MECA_WHEEL_SPEEDS.CTL		
	Z	X	X	X	N/A			MEDIAN_FILTER.CTL		
	Z	X	X	X	N/A			MERWE_SCALED_SIGMA_PTS.ctl		
	Z	X	X	X	N/A			OBSERVER_SNAP_LIST_ITEM.CTL		
	Z	X	X	X	N/A			OBSERVER_SNAPSHOT.CTL		
	Z	X	X	X	N/A			PARAM_STACK_ITEM.CTL		
	Z	X	X	X	N/A			PARAM_STACK.CTL		
	Z	X	X	X	N/A			PID_ADV_LIMITS.CTL		

Revision 2.X   12/07/2021 – Added Bang/Bang – (not very useful)

Z	X	X	X	N/A		PID_ADV_TUNING.CTL	
Z	X	X	X	N/A		PID_CONTROLLER.CTL	
Z	X	X	X	N/A		PID_ERROR_TOLERANCE.CTL	
Z	X	X	X	N/A		PID_INPUT_LIMITS.CTL	
Z	X	X	X	N/A		PID_TUNING.CTL	
Z	X	X	X	N/A		POSE2D.CTL	
Z	X	X	X	N/A		POSEwCURVATURE.CTL	
Z	X	X	X	N/A		PROFILED_PID_CONTROLLER.CTL	
Z	X	X	X	N/A		RAMSETE_EXE_TUNING.CTL	
Z	X	X	X	N/A		RAMSETE.CTL	
Z	X	X	X	N/A		ROTATION2D.CTL	
Z	X	X	X	N/A		SIMPLE_MOTOR_FF.CTL	
Z	X	X	X	N/A		SINGLE_JOINT_ARM_SIM.CTL	
Z	X	X	X	N/A		SLEW_RATE_LIMITER.CTL	
Z	X	X	X	N/A		SPLINE_CTRL_VECTOR.CTL	
Z	X	X	X	N/A		SPLINE.CTL	
Z	X	X	X	N/A		SWERVE_DRIVE_KINEMATICS.CTL	
Z	X	X	X	N/A		SWERVE_DRIVE_MODULE_STATE.CTL	
Z	X	X	X	N/A		SWERVE_DRIVE_ODOMETRY.CTL	
Z	X	X	X	N/A		SWERVE_DRIVE_POSE_EST.CTL	
Z	X	X	X	N/A		TIMER.CTL	
Z	X	X	X	N/A		TRAJ_CONFIG.CTL	
Z	X	X	X	N/A		TRAJ_CONSTRAINT_CENTRIPETAL_ACCEL.CTL	
Z	X	X	X	N/A		TRAJ_CONSTRAINT_DIIF_DRIVE_KINEMATICS.CTL	
Z	X	X	X	N/A		TRAJ_CONSTRAINT_DIIF_DRIVE_VOLTAGE.CTL	
\		X		N/A		TRAJ_CONSTRAINT_JERK.CTL	Routine exists, it is just a shell
Z	X	X	X	N/A		TRAJ_CONSTRAINT_MECA_DRIVE_KINEMATICS.CTL	
Z	X	X	X	N/A		TRAJ_CONSTRAINT_MINMAX.CTL	
Z	X	X	X	N/A		TRAJ_CONSTRAINT_SWERVE_DRIVE_KINEMATICS.CTL	
Z	X	X	X	N/A		TRAJ_STATE.CTL	
Z	X	X	X	N/A		TRAJECTORY_SPLINE_TYPE_ENUM.CTL	
Z	X	X	X	N/A		TRAJECTORY.CTL	
Z	X	X	X	N/A		TRANSFORM2D.CTL	
Z	X	X	X	N/A		TRANSLATION2D.CTL	
Z	X	X	X	N/A		TRAPEZOID_PROFILE_CONSTRAINT.CTL	
Z	X	X	X	N/A		TRAPEZOID_PROFILE_STATE.CTL	
Z	X	X	X	N/A		TRAPEZOID_PROFILE.CTL	
Z	X	X	X	N/A		TWIST2D.CTL	
Z	X	X	X	N/A		UNSCENTED_KALMAN_CORRECT_FUNC_GROUP.CTL	
Z	X	X	X	N/A		UNSCENTED_KALMAN_FILTER.ctl	
Z	X	X	X	N/A		UNSCENTED_KALMAN_NEW_FUNC_GROUP.CTL	
Z	X	X	X	N/A		UTIL_PATHFINDER_CONFIG.CTL	
N/A		N/A		N/A		WAYPOINTS.CTL	Delete – obsolete
Z	X	X	X	NA		WEIGHTED_WAYPOINT.CTL	New V1.5
N/A		N/A		N/A		X_Y_HEADINGS.CTL	Delete – obsolete