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...

> VI Total (X) 965 958
> CTL Total (Z) 111 110
> VI Shell Total (/) 3
> CTRL Shell Total (\) 2

Doc completed Pct 99.26% Optimization Pct 55.67%

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

'======== BASE

'========

							•				
ANALOG DELAY	X Implemented X Documented		X Menu Item	- Execution Optimized	Test Routine	S VI Name AnalogDelay.vi	Function Prototype	Notes Similar to interpolated tree map	Code Review	Test Program	Error Checking
										1	
	Implemented Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	Function Prototype	Notes	Code Review	Test Program	Error Checking
BUMPLESS TRANSFER	X	X				BumplessTransfer Execute.vi		Similar to interpolated tree map			
FUNCTION GENERATOR	X Implemented X Documented		X Menu Item	- Execution Optimized	Test Routine	FunctionGenerator Add Value.vi	Function Prototype	Notes Similar to interpolated tree map	Code Review	Test Program	Error Checking
. Sits from Selfer at the	X X		X	i		FunctionGenerator Add XY.vi		Similar to interpolated tree map			
	XX		X	i		FunctionGenerator Calculate.vi		Similar to interpolated tree map			
	XX		X	SI		FunctionGenerator Clear.vi		emman to mitor polation also mapin			
	XX			1		FunctionGenerator_Execute.vi		Similar to interpolated tree map			
	XX		X	SI		FunctionGenerator_New.vi		Similar to interpolated tree map			
	Implemented Documented		Menu Item	Execution Optimized	Test Routine	Nample Program			Code Review	Test Program	Error Checking
				_ <u>~</u> _			Function Prototype	Notes	රි		Eu
FUNCTION GENERATOR MATRIX			X	1		FunctionGeneratoMatrixr_Add.vi		Similar to interpolated tree map			
	XX	X	X	1		FunctionGenerator_Calculate.vi		Similar to interpolated tree map			

FRC_LabVIEW_Trajectory_Library_Routines.xlsx Page 1 / 38

entation update.													
	X	Χ	X	X	SI			FunctionGenerator_New.vi		Similar to interpolated tree map			
_		I.		•	σ							1	
	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimize	Test Routine	Sample Program		Function Prototype	Notes	Code Review	Test Program	Error Checking
LEAD LAG	Χ		Χ	X				LeadLag Execute.vi		Similar to interpolated tree map			
LINEAR FILTER	Implemented	N	Not WPILIB	X X X X X X X X X X X X X X X X X X X	X	Test Routine	X		Function Prototype	Notes Labview style helper AN INTERNAL ROUTINE	Code Review	Test Program	Error Checking
MEDIAN FILTER	X X X	X X X	X	X	SI SI	Test Routine	X	VI Name MedianFilter_Calculate.vi MedianFilter_Execute.vi MedianFilter_New.vi MedianFilter_Reset.vi MedianFilter_ResetToValue.vi	Function Prototype	Notes Labview style helper	Code Review	Test Program	Error Checking
SLEW RATE FILTER	X X X X X	X X X X X X X X X X X X X X X X X X X	X	X X Wenu Item	SI I SI I	Test Routine	X	VI Name SlewRateLimiter_Calculate.vi SlewRateLimiter_Close.vi SlewRateLimiter_Execute.vi SlewRateLimiter_GetRate.vi SlewRateLimiter_New.vi SlewRateLimiter_NewInitialZero.vi SlewRateLimiter_Reset.vi SlewRateLimiter_Reset.vi SlewRateLimiter_SetRate.vi	Function Prototype	Notes Labview style helper	Code Review	Test Program	Error Checking

22 – After documentation update.								-				
					Optimized							
					imi		E .					70
	g	Ø			Dot	e o	gree			>	Ē	Checking
	nte	nte	97	E		ţį	Progr			evie	grä	ec/
	Implementec	Documentec	Not WPILIB	Item	Execution	Test Routine	ق ا			Code Rev	Test Program	క
	o/e	ğ	ž	กเ	700	st F	R VI Name			ge	st F	
				Menu		ě	წ VI Name	Function Prototype	Notes	ပိ	7 9	Error
TIMER	X		X	X			Timer_Close.vi		releases semaphore			
	Χ	X		X			X Timer_Get.vi					
	X			X			Timer_GetAndReset.vi					
	X		X				Timer_GetInternal.vi		Internal (private) only			
	X	X		X			X Timer_HasPeriodPassed.vi					
	X		X				X Timer_HasPeriodPassedOnce.vi					
	X	X	-	X			X Timer_New.vi X Timer Reset.vi					
	X	X	X				Timer_Reset.vi		Internal (private) only			
	X	X	- ^	X			X Timer_Start.vi		Internal (private) only			
	X	X		X			X Timer_Stop.vi					
	X		X				Timer_StopInternal.vi		Internal (private) only			
				710			Timor_Gtopinternal.vi		internal (private) only			
					þ	i i						
					niz		8					
	75	_			Optin		grai			>	8	Checking
	itec	tec	18	8	0	tine	Progr			/jei	ıraı	S.
	ner	Jer	11.	Item	ţio	no	Ø			Ze.	50,	Sh.
	plementec	Documente	Not WPILIB	nu	Execution	Test Routine	Jdμ			Code Rev	Test Program	9,
	Į Į	Ď	Ñ	Menu	Ě	ě	ର	Function Prototype	Notes	Ö	7es	Error
TIME INTERPOLATABLE BOOLEAN	I X	X	X	X	1		TimeInterpBoolean_AddSample.vi		Update to use create matrix			
	X	X	X	No	1		TimeInterpBoolean_CleanUp.vi		Update to use create matrix			
	Χ				S	1	TimeInterpBoolean_Clear.vi					
	X	X	X	X	1		TimeInterpBoolean_GetSample.vi					
	X	X	X	X	S		TimeInterpBoolean_New.vi					
	X	Χ	Χ	X	S	<i> </i>	TimeInterpBoolean_SetMaxTime.vi					
					ō	i						
					Execution Optimized		•					
					ţi		an J				_	б
	ted	pə,	В	~	ŏ	Routine	Program			je.	Test Program	Checking
	plementec	Documente	Not WPILIB	Menu Item	io,	ith	<u>a</u>			Sev	160.	he
	lem,	un.	Ž	Z Z	cut	A.	R VI Name			O T	Ţ	
	ďμ	200	lot	Je.	ě	Test	S VI Name	Function Prototype	Notes	Cod	esi esi	Error
TIME INTERPOLATABLE DOUBLE	X						TimeInterpDouble_AddSample.vi	unclion i rolotype	Update to use create matrix	0	7	<u> </u>
JERIABLE DOUBLE	X			No	+ ;		TimeInterpoodble_CleanUp.vi		Update to use create matrix			
	X	X	X	X	S	,	TimeInterpDouble_Clear.vi		opacio io dee el edito manix			
	X	X	X	X	1		TimeInterpDouble_GetSample.vi					
	X	X	X	X	S	1	TimeInterpDouble_New.vi					
	Χ	X	X	X	S	1	TimeInterpDouble_SetMaxTime.vi					
					_							
					Optimized							
					imi		E E					6
	ğ	g	~)at	<u> </u>	n de la companya de l			N.	E E	Ķ
	inte	ınte	IL/E	Ж		utin	g.			ević	grč	Checking
	ж	me	٧Þ	ı Ite	utic	Ro	9/0			ď	Program	
	əldı	Documente	Not WPILI	Menu	Execution	Test Routine	S Ample NI Name			Code	Test	Error
	<u> </u>							Function Prototype	Notes	<u> </u>	7e	Ē,
TIME INTERPOLATABLE POSE2D	X		X	X			TimeInterpPose2d_AddSample.vi		Update to use create matrix			
	X		X	No	+ '	,	TimeInterpPose2d_CleanUp.vi		Update to use create matrix			
	X			X	3	'	TimeInterpPose2d_Clear.vi TimeInterpPose2d_GetSample.vi					
	X	У У	X	X	5	,	TimeInterpPose2d_GetSample.vi TimeInterpPose2d_New.vi					
	X	$\frac{\lambda}{X}$	$\frac{\lambda}{X}$	X	S	,	TimeInterprose2d_New.vi					
								1	<u> </u>	l		

FRC_LabVIEW_Trajectory_Library_Routines.xlsx Page 3 / 38

FRC LabVIEW Trajectory Library – VI Implementation	List											
Revision 2.X 5/24/2022 – After documentation update.	Liot											
revision 2.70 G/2 1/2022 Titler documentation apacto.					þ							
					ijζ	5						
					tin	Ş				_	-	ρ
	pe;	<i>p</i> e.	В	~	ŏ	ne				je. Ve	'an	Skir
	eni	ent	7	ltem	00	tt.				e G	lbo.	Che
	nplemente	Ę	¥	u lt	cution	8 3				E C	<u> 7</u>	Ő
	jdι	Documen	Not WPILIB	Menu	Exec	Test Routine	MAI	Francisco Doubeton	Nister	Cod	Test Program	Erro
TIME INTERPOLATARI E ROTATIONOR	=======================================	- Q	_ <	_ <u>≥</u>		F (VI Name TimeInterpRotation2d AddSample.vi	Function Prototype	Notes		<u> </u>	Щ
TIME INTERPOLATABLE ROTATION2D	X	X	X	X No	1		TimeInterpRotation2d_AddSample.vi TimeInterpRotation2d_CleanUp.vi		Update to use create matrix			
	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	X	X	X	1		TimeInterpRotation2d_Clear.vi		Update to use create matrix			
	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	X		X	1		TimeInterpRotation2d_Clear.vi TimeInterpRotation2d_GetSample.vi					
	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	~	<i>\</i>	~	SI		TimeInterpRotation2d_GetSample.vi TimeInterpRotation2d_New.vi					
	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	X		-	SI		TimeInterpRotation2d_New.vi TimeInterpRotation2d_SetMaxTime.vi					
	_ ^	^		_ ^	31		Timemerphotationzu_SetiviaxTime.vi					
					Ø							
					ize							
					ŧį	3						б
	þə	þé	m		do	9 3				eW	am	ķi
	ent	inte	7	Item	2	i di	·			Ġ.	ğ	Chec
	J.	ше	Å.	, Ite	ution	Ro				Ř	Pro	
	Implement	Documente	Not WPILIB	Menu	ec	Test Routine				ge	Test Progi	Error
					ŵ	Test		Function Prototype	Notes	ပိ		
WAIT ADJUST	Χ		Χ	X			WaitAdjust.vi					
					~							
					zec							
					m.	1						7
	Ø	Ø)bti	a g				≥	Ε	ing
	nte	Jte.	-18	E	0	j j				<u>vi</u> e	gra	eck
	ηe	ner	ď.	lte.	ţ.	300				Re	ğ	Š
	ıplemei	Documer	Not WPILIB	Wenu Item	Executio	Test Routine				ge	Test Progra	o.
	JU.	ŏ	Ş	Me	й	Jes Jes	VI Name	Function Prototype	Notes	Ŏ	Je Je	Err
DIGITAL SEQUENTIAL LOGIC	X		X	X			DigSeqLogic_Delay.vi	71				T 7
	Χ	X	Χ	Х			DigSeqLogic_On_Delay.vi					
	Χ	Χ	Χ	Χ			DigSeqLogic_Off_Delay.vi					
	Χ		Χ	Χ			DigSeqLogic_One_Shot.vi					
	X	X	Χ	X			DigSeqLogic_SR_Flip_Flop.vi					
				l l				<u> </u>				
					þ							
					λįζ	5						
					ti.	į				_	~	б
	ented	ented	В	~	d	utine				ë.	ogram	Ski
	ent	ent	ILIB	Item	2	ji č				e V	lbo	hec
	ű.	Ĕ	Ŋ	7 1	cutio	st Ro				œ	Pro	Ó
	ple	700	Vot 1	enn	ec Ge	Test Ro				эрc	Test	70
	<u>=</u>	à	Ž	Me	ш	j je		Function Prototype	Notes	ŭ	<u> </u>	<u>ii</u>
DEBOUNCER	R X	X		X			Debouncer_New.vi					
				X			Debouncer_Calculate.vi					
	X		X	X			Debouncer_Execute.vi					
	X			No			Debouncer_Reset.vi					
	X	X		No			Debouncer_HasElapsed.vi					

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

> ARM FL | Not WPILIF Function Prototype Notes ArmFF_Calculate.vi
> ArmFF_CalculateVelocityOnly.vi
> ArmFF_Execute.vi X LabVIEW style single call

entation update.													
			X					ArmFF_ExecuteVelocityOnly.vi		LabVIEW style single call			
	Χ	Χ		X				ArmFF MaxAchieveAccel.vi					
	X	X		X				ArmFF MaxAchieveVelocity.vi					
	X	X		X				ArmFF MinAchieveAccel.vi					
-			+	\ \ \ \ \ \				Amar F. Min Achieve Accel.vi					
	Χ	X		X				ArmFF_MinAchieveVelocity.vi					
	Χ	X		X				ArmFF_New_ZeroGravity.vi					
	Χ	X		X				ArmFF_New.vi					
BANG BANG	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X	X Not WPILIB	X X X X X X X X X X X X X X X X X X X	ଦ୍ର ଜ ଜ ଜ Execution Optimized	Test Routine	Sample Program	VI Name BangBang_AtSetpoint.vi BangBang_Calculate_PV.vi BangBang_Calculate_SP_PV.vi BangBang_Execute.vi BangBang_GetAll.vi BangBang_GetError.vi BangBang_New.vi BangBang_SetSetpoint.vi	Function Prototype	Notes	Code Review	Test Program	Error Checking
	\hat{X}	X		X	SI			BangBang_SetTolerance.vi					
CONTROLLER UTIL	X Implemented	X Documented	Not WPILIB	X Menu Item	ized <u>©</u> Execution Optimized	Test Routine	Sample Program	VI Name ControllerUtil_GetModulusError.vi	Function Prototype	Notes This was short lived in WPILIB, but still useful here.	Code Review	Test Program	Error Checking
EL EV EE	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimiz	Test Routine	Sample Program		Function Prototype	Notes	Code Review	Test Program	Error Checking
ELEV FF	X	X		X				ElevFF_Calculate.vi					
	Χ	Χ		X				ElevFF_CalculateVelocityOnly.vi					
			X					ElevFF_Execute.vi		LabVIEW style single call			
			X					ElevFF_ExecuteVelocityOnly.vi		LabVIEW style single call			
	Χ	Χ		X				ElevFF MaxAchieveAccel.vi					
	X	X		X				ElevFF_MaxAchieveVelocity.vi					
	\hat{X}	X		X				ElevFF MinAchieveAccel.vi					
-	X	X		X				ElevFF MinAchieveAccel.vi			-	+	
	<u> </u>	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		1								+	
	X	X		X			_	ElevFF_New_ZeroAccel.vi					
l				_ ^	Optimized	<u>o</u>	gram	ElevFF_New.vi			Me	w _e	king
	Implementea	Documentea	Not WPILIB	Menu Item	Execution C	Test Routine	Sample Program				Code Reviev	st Progra	Error Checking
	μ	ŏ	õ	Je.	Ä	မို	šar	VI Name	Function Prototype	Notes	Ŏ	Test	ī.
HOL_DRV_CTRL		X	X	_ <u><</u>	-			HolDrvCtrl_AdvCalculate_Trajectory.vi		Added 1/24/2022			
HOL_DKV_CIRL				1									
	X	X	X	X				HolDrvCtrl_AdvCalculate.vi		Added 1/24/2022			
	Χ			X	SI		L	HolDrvCtrl_AtReference.vi		Added 1/26/21			
	Χ	Χ		X	I			HolDrvCtrl_Calculate_Trajectory.vi		Added 1/26/21			
ļ	X	X		X	1			HolDrvCtrl_Calculate.vi		Added 1/26/21			
-	X	X	X	X				HolDrvCtrl_Execute_Trajectory.vi		Added 1/24/2022			
L	^	^	_ ^	_ ^				HOIDTYOUT_EXECUTE_Hajectory.vi		AUGU 1/24/2022			

ation update.					_	_		I		I= :			
	X	Χ	X		-			HolDrvCtrl_Execute.vi		Future			
	Χ	X		X	SI			HolDrvCtrl_New.vi		Added 1/26/21			
	Χ	Χ			SI			HolDrvCtrl_PackExecuteSP.vi					
	Χ	X	X	X				HolDrvCtrl_PackPID.vi		Added 1/24/2022			
	Χ	X	X					HolDrvCtrl_PackProfPID.vi		Added 1/24/2022			
	X	X		X	SI			HolDrvCtrl_SetEnabled.vi		Added 1/26/21			
	Χ	Χ		X	SI			HolDrvCtrl_SetTolerance.vi		Added 1/26/21			
· ·													
PID AUTOTUNE	X Implemented	Documented	X Not WPILIB	S Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
PID AUTOTUNE								PIDAutoTune_ClosedLoopStep.vi					
	X		X	No				PIDA.t. T. Overland Object Office of the Control of					
	X		X					PIDAutoTune_OpenLoopStep.vi					
	Χ		X	X				PIDAutoTune_SetTuningArguments.vi					
	Χ		X	X				PIDAutoTune_Step.vi					
	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program		Function Prototype	Notes	Code Review	Test Program	Error Checking
PID CONTROLLER	Χ	X	X	X				PIDController_AdvCalculate_FF_Sp_Pv_Per.vi		Advanced PID			
	Χ	X	X	X				PIDController_AdvCalculate_FF_Sp_Pv.vi		Advanced PID			
	Χ	X	X	X			X	PIDController AdvExecute.vi		Labview style helper. Advanced			
										PID			
	Χ	X		X	SI			PIDController_AtSetpoint.vi					
	Χ	Χ		X				PIDController Calculate PV.vi					
	Χ	X		X				PIDController_Calculate_SP_PV.vi					
	X	X		X	SI			PIDController_DisableContinousInput.vi					
	X	X		X	SI			PIDController_EnableContinousInput.vi					
	X	X	X		- 0,		X			Labview style helper			
	^	^	^	^			^	PIDController GetContinuousError.vi		OBSOLETE – Removed			
	· · ·	V			0/					OBSOLETE - Removed			
	Χ	X		X	SI			PIDController_GetPeriod.vi					
	Χ	Χ		X	SI			PIDController_GetPID.vi					
	Χ	X		X	SI			PIDController_GetPositionError.vi					
	Χ	X		X	SI			PIDController_GetSetpoint.vi					
	X	X		X	SI			PIDController_GetVelocityError.vi					
	Χ	Χ		X	SI			PIDController IsContinuousInputEnabled.vi					
	Χ	X		X	1			PIDController New.vi					
	Χ	Χ		X	1			PIDController_NewPeriod.vi					
	X		X			1		PIDController Pack AdvLimits.vi					
	X	X	X	$\frac{\lambda}{X}$	SI	1	_	PIDController_Pack_AdvTuning.vi					
	X	X		$\frac{\lambda}{X}$	SI	+	_	PIDController Pack ErrorTolerance.vi					
	X	X			SI			PIDController_Pack_InputLimits.vi					
	\overline{x}	X			SI			PIDController_Pack_Tuning.vi					
			^			_		PIDController_Pack_runling.vi					
	X	X		X	SI		_	PIDController_Reset.vi					
	Χ	X		X	SI			PIDController_SetD.vi					
	Χ	X						PIDController_SetDerivativeFilter.vi		Advanced PID			
	Χ	X	X	No				PIDController_SetFeedForward_OBSOLETE_DELETE.vi		Advanced PID, Obsolete – DELETE			
	Χ	Χ	X	No				PIDController_SetFFGain_OBSOLETE_DELETE.vi		Advanced PID, Obsolete – DELETE			
	X	X		X	SI			PIDController_SetI.vi					
								PIDController_SetInputRange.vi		OBSOLETE – Removed			
	Χ	Χ		Χ	SI			PIDController_SetIntegratorRange.vi					
	X	X			SI			PIDController SetOutputLimits.vi		Advanced PID			
	X	X	<u> </u>	X				PIDController SetP.vi					
	X	X	Y	$\frac{\lambda}{X}$				PIDController SetPeriod.vi					
	\hat{x}	X	_^	$\frac{1}{X}$	SI		+	PIDController SetPID.vi					
		X	~	$\frac{\lambda}{X}$	SI	1		PIDController_SetPID.vi		Advanced PID			
	٨	٨	_ ^) Si			FIDOURIUMEI_SetFIDF.VI		Auvanceu FID			

XXXX	(SI	PIDController_SetSetpoint.vi		
XXXX	(SI	PIDController_SetTolerance.vi		
XXXX	(SI	PIDController_SetTolerancePandV.vi		

	Χ	X		X	SI			PIDController_SetTolerance.vi					
	Χ	Χ		X				PIDController SetTolerancePandV.vi					
					imized	•	•	a a					<i>D</i>
	Implemented	Documented	WPILIB	Menu Item	Execution Opt	;	Test Routine	ole Progr			Review	Program	Checking
	gd	n	Not I	ent	éc	,	st	d d d d d d d d d d d d d d d d d d d			эрс	Test	Error
			ĮΣ				<u>~</u>		Function Prototype	Notes		<u> </u>	<u></u>
PROFILED PID CONTROLLER		Χ		X				ProfiledPIDController_AtGoal.vi					
	Χ	X		X		<u> </u>		ProfiledPIDController_AtSetpoint.vi					
	Χ	Χ		X				ProfiledPIDController_Calculate_Meas_Goal.vi					
	Χ	X		X				ProfiledPIDController_Calculate_Meas_StateGoal_TrapCnsrt.vi					
	Χ	Χ		X				ProfiledPIDController_Calculate_Meas_StateGoal.vi					
	Χ	Χ		X				ProfiledPIDController_Calculate_Meas.vi					
	Χ	X		X				ProfiledPIDController_DisableContInput.vi					
	Χ	X		X				ProfiledPIDController_EnableContInput.vi					
	X	X	X	X	1			ProfiledPIDController_Execute.vi		Single call LabVIEW style function.			
	Χ	Χ		X				ProfiledPIDController_GetGoal.vi					
	X	X		X				ProfiledPIDController_GetPeriod.vi					
	X	Χ	X	X				ProfiledPIDController_GetPID.vi		WPILIB has separate getters.			
	Χ	Χ		X				ProfiledPIDController_GetPositionError.vi					
	Χ	Χ		X				ProfiledPIDController_GetSetpoint.vi					
	Χ	Χ		X	SI			ProfiledPIDController_GetVelocityError.vi					
	Χ	Χ		X	1			ProfiledPIDController_New.vi					
	Χ	Χ		X	1			ProfiledPIDController_NewPeriod.vi					
	Χ	Χ		X	SI	'		ProfiledPIDController_Reset_PosOnly.vi					
	Χ	Χ		X				ProfiledPIDController_Reset_PosVel.vi					
	Χ	Χ		X	SI	'		ProfiledPIDController_Reset.vi					
	Χ	Χ		X	SI	'		ProfiledPIDController_SetConstraints.vi					
	Χ	Χ		X	SI			ProfiledPIDController_SetGoal_PosOnly.vi					
	Χ	Χ		X				ProfiledPIDController SetGoal.vi					
	Χ	Χ		X				ProfiledPIDController_SetIntegratorRange.vi					
	Χ	Χ		X		·		ProfiledPIDController SetPID.vi					
	Χ	Χ		X				ProfiledPIDController_SetTolerance_PosOnly.vi					
	Χ	Χ		X				ProfiledPIDController_SetTolerance_PosVel.vi					
	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	;	≍	Nample Program	For the Dodge	M. d. c.	Code Review	Test Program	Error Checking
B.110	-2	Ď	_ <				<u> </u>		Function Prototype	Notes		<u> </u>	<u> </u>
RAMSETE			-	X			_		AtReference				
	X		-	X	X		_		calculate_trajectory			-	
	X		V	X	X		-		calculate				
	X	X	X	X	X			Ramsete_Diff_DO_Eng.vi					
	X	X	X		X		_	Ramsete_Diff_DO_SI.vi	l lea deia anall				
	X				1		-		Use this one!!				
	X	X	X	X	SI	-		Ramsete_Execute_PackTuning_ENG.vi					
	Χ	Χ	X	X	SI			Ramsete_Execute_PackTuning.vi					

SETE >	(X		X	SI	Ramsete_AtReference.vi	AtReference		
>	(Χ		Χ	X	Ramsete_Calculate_Trajectory.vi	calculate_trajectory		
>	(X		Χ	X	Ramsete_Calculate.vi	calculate		
>	(X	X	Χ	X	Ramsete_Diff_DO_Eng.vi			
>	(Χ	X	Χ	X	Ramsete_Diff_DO_SI.vi			
>	(Χ	X	Χ	1	Ramsete_Execute_ENG.vi	Use this one!!		
>	(Χ	X	Χ	SI	Ramsete_Execute_PackTuning_ENG.vi			
>	(X	X	Χ	SI	Ramsete_Execute_PackTuning.vi			
>	(X	X	Χ	1	Ramsete_Execute.vi			
>	(Χ		Χ	SI	Ramsete_New_B_Z.vi	new(b, zeta)		
>	(X		Χ	SI	Ramsete_New.vi	new		
>	(X		Χ	SI	Ramsete_SetEnabled.vi	SetEnabled		
>	(Χ		Χ	SI	Ramsete_SetTolerance.vi	SetTolerance		
>	(X		X	X	Ramsete_SINC.vi	sinc	internal	

FRC LabVIEW Trajectory Library – VI Implementation List Revision 2.X 5/24/2022 – After documentation update. Execution Optimized Routine Menu Item Not Function Prototype Notes SIMPLE MOTOR FEEDFORWARD X X X SI SimpleMotorFF Calculate CalcAccel.vi SimpleMotorFF Calculate NextV Dt.vi Χ Χ X 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 SimpleMotorFF MaxAchieveAccel.vi public double maxAchievableAcceleration(double maxVoltage, double velocity) Χ X Χ SimpleMotorFF MaxAchieveVel.vi public double maxAchievableVelocity(double maxVoltage, double acceleration) X X X SimpleMotorFF MinAchieveAccel.vi public double minAchievableAcceleration(double maxVoltage, double velocity) Χ SimpleMotorFF_MinAchieveVel.vi Χ X public double minAchievableVelocity(double maxVoltage, double acceleration)
public SimpleMotorFeedforward(double ks, double kv, double ka) SimpleMotorFF New.vi X X Χ SI public SimpleMotorFeedforward(double ks, double kv) '======== GEOMETRY '======== Routii VI Name Function Prototype Notes CoordAxis D.vi COORDINATE AXIS X X X SI X SI CoordAxis_E.vi Χ X X X SI CoordAxis N.vi Χ X SI CoordAxis New.vi Χ X SI X CoordAxis S.vi XX X SI CoordAxis U.vi XX X SI CoordAxis W.vi Function Prototype Notes COORDINATE SYSTEM XX Χ SI X CoordSystem Convert Pose3d.vi X SI CoordSystem Convert Rotation3d.vi XX CoordSystem_Convert_Translation3d.vi XX X SI X SI X CoordSystem_EDN.vi X X Χ CoordSystem_NED.vi Χ X SI X CoordSystem_New.vi X X X SI X X SI X CoordSystem NWU.vi

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program ame		Function Prototype	Notes	Code Review	Test Program	Error Checking
POSE2D	X	X		X	SI		Pose2d_Equals.VI		boolean equals(other obj)				
	Χ	X		X	Χ		Pose2d_Exp.vi		pose2d exp(twist2d twist)				
	Χ	X		X	SI		Pose2d_getRotation.vi		rotation2d getRotation()	can also use cluster unpack			
	Χ	X		X	SI		Pose2d_getTranslation	.vi	translation2d getTranslation()	can also use cluster unpack			

tion update.												
	X	Χ	$X \mid X$	SI			Pose2d_getXY.vi					
	Χ	Χ	X X				Pose2d_getXYAngle.vi					
	Χ	Χ	X				Pose2d_Interpolate.vi					
	Χ	Χ	X	X			Pose2d_Log.vi	twist2d log(pose2d end)				
	Χ	X	X				Pose2d_Minus.vi	transform2d minus(pose2d other)				
		Χ	X				Pose2d_New_TRRO.vi	pose2d new(translation2d, rotation2d)				
		Χ	X				Pose2d_New.vi	pose2d new(double x, double y, rotation2d)				
	Χ	Χ	X				Pose2d_Plus.vi	pose2d plus(transform2d other)				
		Χ	X				Pose2d_RelativeTo.vi	pose2d relativeto(pose2d other)				
	Χ	Χ	X	SI			Pose2d_TransformBy.vi	pose2d transformby(transform2d other)				
								pose2d new()	can use cluster constant			
				~								
				Optimized								
				ii.		Program						D
	g	Ø	m	þ	ā	gr				M	E	į
	Implemented	Documented	Not WPILIB Menu Item	2	Test Routine	5				Code Review	Test Program	Checking
	ше	ше	<u>F</u>	JĘ:	ર્જુ	e				ቖ	2	ઇ
	a)e	mo	7 7	ည	st F	ш				qe	st F	ō
	Ĕ	Š	Not WPILI. Menu Item	Execution	je L	Sample	VI Name	Function Prototype	Notes	Š	Je Je	Error
POSE3D	Χ	Χ	X				Pose3d_Equals.VI					
	Χ	Χ	X	X			Pose3d Exp.vi					
	Χ	X	X				Pose3d_getRotation.vi					
	X	X	X				Pose3d getTranslation.vi					
	X	X	$X \mid X$	SI			Pose3d_getXYZ.vi					
	X	X	$X \times X$	1			Pose3d_Interpolate.vi					
	X	X	X				Pose3d_Log.vi					
	X	X	X				Pose3d Minus.vi					
-		X	$\frac{\lambda}{X}$				Pose3d New.vi					
	^	^										
		X	X				Pose3d_New_Default.vi					
	X	X	X	SI			Pose3d_New_Trans3dRot3d.vi					
		X	X				Pose3d_Plus.vi					
		X	X				Pose3d_RelativeTo.vi					
	X	X	No				Pose3d_RotationVectorToMatrix.vi					
		Χ	X				Pose3d_ToPose2d.vi					
	X	Χ	X	SI			Pose3d_TransformBy.vi					
-												
				pəz								
				mized								
				ptimized	a	gram				Ŋ	E	ing
			IB n		tine	rogram				view	yram	ecking
			PILIB	tion Optimized	outine	e Program				Review	rogram	Shecking
			WPILIB	cution Optimized	t Routine	nple Program				le Review	t Program	or Checking
			lot WPILIB	execution Optimized	est Routine	sample Program	VI Name	Function Prototyne	Notes	ode Review	est Program	ă
QUATERNION	Implemented	Documented	N N	Ĕ	Test Routine	Sample Program	VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
QUATERNION	X Implemented	X Documented	X	SI	Test Routine		Quaternion_Equals.vi	Function Prototype	Notes	Code Review	Test Program	ğ
QUATERNION	X X Implemented	X X Documented	X	SI	Test Routine		Quaternion_Equals.vi Quaternion_Get_All.vi	Function Prototype	Notes	Code Review	Test Program	ă
QUATERNION	X X Implemented	X X Documented	X X X	SI SI	Test Routine		Quaternion_Equals.vi Quaternion_Get_All.vi Quaternion_Get_LVQuat.vi	Function Prototype	Notes	Code Review	Test Program	ă
QUATERNION	X X Implemented	X X Documented	X X X	SI SI SI	Test Routine		Quaternion_Equals.vi Quaternion_Get_All.vi Quaternion_Get_LVQuat.vi Quaternion_Get_Vect.vi	Function Prototype	Notes	Code Review	Test Program	ă
QUATERNION	X X Implemented	X X Documented	X X X X	SI SI SI SI	Test Routine		Quaternion_Equals.vi Quaternion_Get_All.vi Quaternion_Get_LVQuat.vi Quaternion_Get_Vect.vi Quaternion_Get_W.vi	Function Prototype	Notes	Code Review	Test Program	ă
QUATERNION [X X Implemented	X X Documented	X X X X X	SI SI SI SI SI	Test Routine		Quaternion_Equals.vi Quaternion_Get_All.vi Quaternion_Get_LVQuat.vi Quaternion_Get_Vect.vi Quaternion_Get_W.vi Quaternion_Inverse.vi	Function Prototype	Notes	Code Review	Test Program	ă
QUATERNION [X X X X X X X X X X X X X X X X X X X	X Documented X X X X X X	X X X X X X	SI SI SI SI SI SI	Test Routine		Quaternion_Equals.vi Quaternion_Get_All.vi Quaternion_Get_LVQuat.vi Quaternion_Get_Vect.vi Quaternion_Get_W.vi Quaternion_Inverse.vi Quaternion_New.vi	Function Prototype	Notes	Code Review	Test Program	ă
QUATERNION [X X X X X X X X X X X X X X X X X X X	X Documented X X X X X X X X X X X X X X X X X X X	X	SI SI SI SI SI SI SI	Test Routine		Quaternion_Equals.vi Quaternion_Get_All.vi Quaternion_Get_LVQuat.vi Quaternion_Get_Vect.vi Quaternion_Get_W.vi Quaternion_Inverse.vi Quaternion_New.vi Quaternion_New_Default.vi	Function Prototype	Notes	Code Review	Test Program	ă
QUATERNION [X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X	X	SI SI SI SI SI SI SI	Test Routine		Quaternion_Equals.vi Quaternion_Get_All.vi Quaternion_Get_LVQuat.vi Quaternion_Get_Vect.vi Quaternion_Get_W.vi Quaternion_Inverse.vi Quaternion_New.vi Quaternion_New_Default.vi Quaternion_New_LVQuat.vi	Function Prototype	Notes	Code Review	Test Program	ă
QUATERNION [X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X	X	SI SI SI SI SI SI SI SI	Test Routine		Quaternion_Equals.vi Quaternion_Get_All.vi Quaternion_Get_LVQuat.vi Quaternion_Get_Vect.vi Quaternion_Get_W.vi Quaternion_Inverse.vi Quaternion_New.vi Quaternion_New_Default.vi Quaternion_New_LVQuat.vi Quaternion_Normalize.vi	Function Prototype	Notes	Code Review	Test Program	ă
QUATERNION [X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X	X	SI SI SI SI SI SI SI SI	Test Routine		Quaternion_Equals.vi Quaternion_Get_All.vi Quaternion_Get_LVQuat.vi Quaternion_Get_Vect.vi Quaternion_Get_W.vi Quaternion_Inverse.vi Quaternion_New.vi Quaternion_New_Default.vi Quaternion_New_LVQuat.vi Quaternion_Normalize.vi Quaternion_Plus.vi	Function Prototype	Notes	Code Review	Test Program	ă
QUATERNION	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X	X	SI SI SI SI SI SI SI SI	Test Routine		Quaternion_Equals.vi Quaternion_Get_All.vi Quaternion_Get_LVQuat.vi Quaternion_Get_Vect.vi Quaternion_Get_W.vi Quaternion_Inverse.vi Quaternion_New.vi Quaternion_New_Default.vi Quaternion_New_LVQuat.vi Quaternion_Normalize.vi Quaternion_Plus.vi Quaternion_Times.vi	Function Prototype	Notes	Code Review	Test Program	ă
QUATERNION	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X	X	SI SI SI SI SI SI SI SI	Test Routine		Quaternion_Equals.vi Quaternion_Get_All.vi Quaternion_Get_LVQuat.vi Quaternion_Get_Vect.vi Quaternion_Get_W.vi Quaternion_Inverse.vi Quaternion_New.vi Quaternion_New_Default.vi Quaternion_New_LVQuat.vi Quaternion_Normalize.vi Quaternion_Plus.vi	Function Prototype	Notes	Code Review	Test Program	ğ
QUATERNION	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X	X	SI SI SI SI SI SI SI SI	Test Routine		Quaternion_Equals.vi Quaternion_Get_All.vi Quaternion_Get_LVQuat.vi Quaternion_Get_Vect.vi Quaternion_Get_W.vi Quaternion_Inverse.vi Quaternion_New.vi Quaternion_New_Default.vi Quaternion_New_LVQuat.vi Quaternion_Normalize.vi Quaternion_Plus.vi Quaternion_Times.vi	Function Prototype	Notes	Code Review	Test Program	ă
QUATERNION	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X	X	SI SI SI SI SI SI SI SI	Test Routine		Quaternion_Equals.vi Quaternion_Get_All.vi Quaternion_Get_LVQuat.vi Quaternion_Get_Vect.vi Quaternion_Get_W.vi Quaternion_Inverse.vi Quaternion_New.vi Quaternion_New_Default.vi Quaternion_New_LVQuat.vi Quaternion_Normalize.vi Quaternion_Plus.vi Quaternion_Times.vi	Function Prototype	Notes	Code Review	Test Program	ă
QUATERNION	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X	X	SI SI SI SI SI SI SI SI	Test Routine		Quaternion_Equals.vi Quaternion_Get_All.vi Quaternion_Get_LVQuat.vi Quaternion_Get_Vect.vi Quaternion_Get_W.vi Quaternion_Inverse.vi Quaternion_New.vi Quaternion_New_Default.vi Quaternion_New_LVQuat.vi Quaternion_Normalize.vi Quaternion_Plus.vi Quaternion_Times.vi	Function Prototype	Notes	Code Review	Test Program	ă
QUATERNION	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X	X	SI SI SI SI SI SI SI SI	Test Routine		Quaternion_Equals.vi Quaternion_Get_All.vi Quaternion_Get_LVQuat.vi Quaternion_Get_Vect.vi Quaternion_Get_W.vi Quaternion_Inverse.vi Quaternion_New.vi Quaternion_New_Default.vi Quaternion_New_LVQuat.vi Quaternion_Normalize.vi Quaternion_Plus.vi Quaternion_Times.vi	Function Prototype	Notes	Code Review	Test Program	ă
QUATERNION	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X	X	SI SI SI SI SI SI SI SI			Quaternion_Equals.vi Quaternion_Get_All.vi Quaternion_Get_LVQuat.vi Quaternion_Get_Vect.vi Quaternion_Get_W.vi Quaternion_Inverse.vi Quaternion_New.vi Quaternion_New_Default.vi Quaternion_New_LVQuat.vi Quaternion_Normalize.vi Quaternion_Plus.vi Quaternion_Times.vi	Function Prototype	Notes	8	Test	Error
QUATERNION	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X	X				Quaternion_Equals.vi Quaternion_Get_All.vi Quaternion_Get_LVQuat.vi Quaternion_Get_Vect.vi Quaternion_Get_W.vi Quaternion_Inverse.vi Quaternion_New.vi Quaternion_New_Default.vi Quaternion_New_LVQuat.vi Quaternion_Normalize.vi Quaternion_Plus.vi Quaternion_Times.vi	Function Prototype	Notes	8	Test	Error
QUATERNION	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X	X				Quaternion_Equals.vi Quaternion_Get_All.vi Quaternion_Get_LVQuat.vi Quaternion_Get_Vect.vi Quaternion_Get_W.vi Quaternion_Inverse.vi Quaternion_New.vi Quaternion_New_Default.vi Quaternion_New_LVQuat.vi Quaternion_Normalize.vi Quaternion_Plus.vi Quaternion_Times.vi	Function Prototype	Notes	8	Test	Error
QUATERNION	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X	X				Quaternion_Equals.vi Quaternion_Get_All.vi Quaternion_Get_LVQuat.vi Quaternion_Get_Vect.vi Quaternion_Get_W.vi Quaternion_Inverse.vi Quaternion_New.vi Quaternion_New_Default.vi Quaternion_New_LVQuat.vi Quaternion_Normalize.vi Quaternion_Plus.vi Quaternion_Times.vi	Function Prototype	Notes	8	Program Test	Error
QUATERNION	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X	X		Test Routine	mple Program	Quaternion_Equals.vi Quaternion_Get_All.vi Quaternion_Get_LVQuat.vi Quaternion_Get_Vect.vi Quaternion_Get_W.vi Quaternion_Inverse.vi Quaternion_New.vi Quaternion_New_Default.vi Quaternion_New_LVQuat.vi Quaternion_Normalize.vi Quaternion_Plus.vi Quaternion_Times.vi	Function Prototype Function Prototype	Notes	Code Review	Test Program	ğ

					T	
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_Equals.vi	boolean equals(rotation2d other)	
X	XX	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

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Nample Program	Function Prototype	Notes	Code Review	Test Program	Error Checking
ROTATION3D	Χ	X		Χ	SI		Rotation3d_Create_AxisAngle.vi					
	Χ	Χ		Χ	SI		Rotation3d_Create_Default.vi					
	Χ	X		Χ	SI		Rotation3d_Create_Quaternion.vi					
	Χ	X		Χ	SI		Rotation3d_Create_RollPitchYaw.vi					
	X	X		X	SI		Rotation3d_Equals.vi					
	Χ	X	X	Χ	SI		Rotation3d_GetAxisAngle.vi					
	Χ	X		Χ	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		Χ	SI		Rotation3d_Plus.vi					
	Χ	X		Χ	SI		Rotation3d_RotateBy.vi					
	X	X		X	SI		Rotation3d_Times.vi					
	X	X		X			Rotation3d_ToRotation2d.vi					
	X	X		Χ	SI		Rotation3d_UnaryMinus.vi					
					_							

TRANSFORM2D 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 Equals.VI boolean equals(other transform2d) X X X X SI Transform2d GetRotation.VI rotation2d getRotation() use cluster unpack X X X X SI Transform2d GetXY.vi use cluster unpack X X X X SI Transform2d GetXY.vi use cluster unpack X X X X SI Transform2d GetXY.vi new X X X X SI Transform2d Inverse.vi transform inverse() new X X X X SI Transform2d Times.vi transform2d times(double scalar) X X X X X X X X X		Implementec	Documentea	Not WPILIB	Menu Item	Execution O	Test Routine	Sample Prog	VI Name	Function Prototype	Notes	Code Reviev	Test Prograr	Error Checki
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 SI Transform2d_GetXYAngle.vi X X X SI Transform2d_Inverse.vi transform inverse() new X X X SI Transform2d_Plus.vi transform2d times(double scalar)	TRANSFORM2D	Χ	Χ		X	SI			Transform2d_Create_PosePose.vi	transform2d new(pose2d, pose2d)				
X X X SI Transform2d_GetRotation.VI rotation2d getRotation() use cluster unpack X X X X X SI Transform2d_GetTranslation.VI translation2d getTranslation() use cluster unpack X X X X X SI Transform2d_GetXY.vi X X X X X SI Transform2d_GetXYAngle.vi X X X X X SI Transform2d_Inverse.vi transform inverse() new X X X X SI Transform2d_Plus.vi X X X X SI Transform2d_Plus.vi transform2d_times(double scalar)			Χ		X	SI			Transform2d_Create_TransRot.vi	transform2d new(translation2d, rotation2d)				
X X SI Transform2d_GetTranslation.VI translation2d getTranslation() use cluster unpack X X X X SI Transform2d_GetXY.vi X X X SI Transform2d_GetXYAngle.vi X X X SI Transform2d_Inverse.vi transform inverse() new X X X Si Transform2d_Plus.vi transform2d times(double scalar)			Χ			SI			Transform2d_Equals.VI	boolean equals(other transform2d)				
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 transform2d times(double scalar)			Χ		X	SI			_		use cluster unpack			
X X X X SI Transform2d_GetXY.VI X X X X SI Transform2d_Inverse.vi transform inverse() new X X X Si Transform2d_Plus.vi transform2d times(double scalar) X X X SI Transform2d_Times.vi transform2d times(double scalar)		Χ	Χ		X	SI			Transform2d_GetTranslation.VI	translation2d getTranslation()	use cluster unpack			
X X X SI Transform2d_Inverse.vi transform inverse() new X X X Si Transform2d_Plus.vi transform2d times(double scalar) X X X SI Transform2d_Times.vi transform2d times(double scalar)			Χ	Χ	X	SI			Transform2d_GetXY.vi					
X X X SI Transform2d_inverse.vi Items/orm inverse() Items/orm inverse() X X X Si Transform2d_Plus.vi transform2d times(double scalar) X X X SI Transform2d_Times.vi transform2d times(double scalar)		Χ	Χ	Χ	X	SI			Transform2d_GetXYAngle.vi					
X X X SI Transform2d_Ptds.vi X X X SI Transform2d_Times.vi transform2d times(double scalar)			Χ		X	SI			Transform2d_Inverse.vi	transform inverse()	new			
X X X SI Irransiormzd_Times.vi transformzd times (double scalar)		X	X		X	Si			Transform2d_Plus.vi					
transform2d new() can use cluster constant		Χ	Χ		X	SI			Transform2d_Times.vi	transform2d times(double scalar)				
										transform2d new()	can use cluster constant			

FRC_LabVIEW_Trajectory_Library_Routines.xlsx Page 10 / 38

entation update.									-				
TRANSFORM3D	X X X Implemented	X X X Documented	Not WPILIB	X X Wenu Item	S S S Execution Optimized	Test Routine	Sample Program	VI Name Transform3d_Create_Default.vi Transform3d_Create_Pose3dPose.3dvi Transform3d_Create_Trans3dRot3d.vi Transform3d_Equals.VI Transform3d_GetRotation3d.VI	Function Prototype	Notes	Code Review	Test Program	Error Checking
	X X X X	X X X X	X	X X X X	SI SI Si Si			Transform3d_GetTranslation3d.VI Transform3d_GetXYZ.vi Transform3d_Inverse.vi Transform3d_Plus.vi Transform3d_Times.vi					
TRANSLATION2D	X Implemented	X Documented	Not WPILIB	X Menu Item	Secution Optimized	Test Routine	Sample Program	VI Name Translation2d_Create_DistAng.vi	Function Prototype	Notes	Code Review	Test Program	Error Checking
	X X X X X X X	X X X X X X X	X	X X X X X X X	SI SI SI SI SI SI SI SI			Translation2d Create.vi Translation2d Equals.vi Translation2d GetAngle.vi Translation2d GetDistance.vi Translation2d GetNorm.VI Translation2d GetX.VI Translation2d GetX.VI Translation2d GetY.VI Translation2d GetY.VI	translation2d new(double x, double y) boolean equals(translation other) double getDistance(translation2d other) double getNorm() double getX() double getY()	can use cluster unpack can use cluster unpack can use cluster unpack			
	X X X X X	X X X X X		X X X X X	SI SI SI SI SI SI			Translation2d_Interpolate.vi Translation2d_Minus.vi Translation2d_Plus.vi Translation2d_RotateBy.vi Translation2d_Times.vi Translation2d_UnaryMinus.vi	translation2d minus(translation2d other) translation2d plus(translation2d other) translation2d rotateBy(rotation2d other) translation2d times(double scalar) translation2d unaryminus() translation2d new()	can use cluster constant			
	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	translation2d div(double scalar) Function Prototype	can multiply by 1/scalar Notes	Code Review	Test Program	Error Checking
TRANSLATION3D	X	X		X	SI SI			Translation3d_Create.vi Translation3d Create Default.vi					
	X	X		X	SI			Translation3d_Create_Default.vi Translation3d Create_DistAng.vi					
	X	Χ		Χ	SI			Translation3d_Div.vi					
	X	X		X	SI SI			Translation3d_Equals.vi Translation3d GetDistance.vi					
	X	\overline{X}		X	SI			Translation3d_GetNorm.VI					
	X	X	X	X	SI			Translation3d_GetXYZ.vi					
	X	X		X	SI SI			Translation3d_Interpolate.vi					
	X	X		X	SI	-		Translation3d_Minus.vi Translation3d Plus.vi					
	X	X		X	SI			Translation3d_RotateBy.vi					
	X	X		X	SI			Translation3d_Times.vi					
	Χ	Χ		Χ	SI			Translation3d_ToTranslation2d.vi			-		
	X	X		Χ	SI			Translation3d_UnaryMinus.vi					

						mized							
		þe	þ	m		Optii	e Je				8	am	Checking
		Implemente	Documentec) [Item		Test Routine				Code Revie	Test Progra	hec
		olen	uno	Not WPIL	nu I	Execution	ž ž				de F	st Pi	o,
				Ş	Menu			VI Name	Function Prototype	Notes	Š		Error
	TWIST		X		X	SI		Twist2d_Create.vi	twist new(x, y, theta)				
		X	X		X	SI		Twist2d_Equals.VI Twist2d_GetAll.VI	boolean equals(obj other)				
		_ ^	^	^		31		TWISTZU_GETAII.VI	I .				
						pəz							
						imi							,
		pə	eq	В		Do	ne				ě	ат	iecking
		Implemente	Documente	WPILIB	ltem	ion	Test Routine				Revi	'og	Сһес
		len	unc	Š	וח	Execution	# Y				Je F	t P	
				Not	Menu			VI Name	Function Prototype	Notes	Code	Test	Error
	TWIST				X		X	Twist3d_Create.vi					
		X	X	X	X	SI SI	X	Twist3d_Equals.VI Twist3d_GetAll.VI					
		^_	^	^		31	^	TWIStOU_GETAII.VI	I				
=======													
KINEMATICS													
========						ō							
						nize							
		77	~			ptin	4				>	8	ing
		nte	ntec	riB	3	o O	ıtine				wie	graı	Checking
		me	cumente	Μ	/ Ite	utio	ROL				de Revie	P.O	Š
		Implement	G	Not WPILIB	Menu Item	Execution	Test Routine	VI Name	5 6 8 4		oqe	Test Progra	Error
	CHASSIS SPEE		X	_ <	_ ≥	Ы SI	<u> </u>	VI Name ChassisSpeeds_FromFieldRelativeSpeeds.VI	Function Prototype chassisspeeds fromFieldRelativeSpeeds(double x, double y,	Notes	<u></u>	<u> </u>	<u> </u>
	CHASSIS OF LE								double angvel, rotation2d robotangle)				
							- 1	01 100 1 0 000					
		X		X	X			ChassisSPeeds_GetXYOmega.vi					
		X		X	X	SI SI		ChassisSpeeds_GetXYOmega.vi ChassisSpeeds_New.vi	chassisspeeds new (double xvel, double yvel, double angvel)	can use cluster constant			
				X				ChassisSpeeds_GetXYOmega.vi ChassisSpeeds_New.vi	chassisspeeds new (double xvel, double yvel, double angvel) chassisspeeds new ()	can use cluster constant			
				X				ChassisSPeeds_GetXYOmega.vi ChassisSpeeds_New.vi		can use cluster constant			
				X		imized S		ChassisSPeeds_GetXYOmega.vi ChassisSpeeds_New.vi		can use cluster constant			6
		X	X		X	imized S	16	ChassisSPeeds_GetXYOmega.vi ChassisSpeeds_New.vi		can use cluster constant	ew	am	king.
		X	X	ягль	X	ง Optimized	outine	ChassisSpeeds_New.vi		can use cluster constant	Review	ogram	hecking
		X	X	WPILIB	X	ง Optimized	rt Routine	ChassisSPeeds_GetXYOmega.vi ChassisSpeeds_New.vi		can use cluster constant	Re	Ā	Che
		X	X	ягль	X	ง Optimized	Test Routine	ChassisSpeeds_New.vi	chassisspeeds new ()	can use cluster constant	Code Review		λe.
	DIFFERENTIAL DRIVE KINEMATI	X Implemented	X Documented	Not WPILIB	X Menu Item	- Execution Optimized	X Test Ro	ChassisSpeeds_New.vi VI Name DiffKinematics_New.vi	Function Prototype diffDriveKine new(double trackWidth)		Re	st Pr	or Che
	DIFFERENTIAL DRIVE KINEMATI	X X Implemented	X Documented	Not WPILIB	X Wenu Item	X - Execution Optimized	X X Test Ro	ChassisSpeeds_New.vi VI Name DiffKinematics_New.vi DiffKinematics_toChassisSpeed.vi	Function Prototype diffDriveKine new(double trackWidth) chassisSpeeds toChassisSpeeds(diffDrWheelSpeeds)		Re	st Pr	or Che
	DIFFERENTIAL DRIVE KINEMATI	X X Implemented	X Documented	Not WPILIB	X Wenu Item	- Execution Optimized	X X Test Ro	ChassisSpeeds_New.vi VI Name DiffKinematics_New.vi	Function Prototype diffDriveKine new(double trackWidth)		Re	st Pr	or Che
	DIFFERENTIAL DRIVE KINEMATI	X X Implemented	X Documented	Not WPILIB	X Wenu Item	X - Execution Optimized	X X Test Ro	ChassisSpeeds_New.vi VI Name DiffKinematics_New.vi DiffKinematics_toChassisSpeed.vi	Function Prototype diffDriveKine new(double trackWidth) chassisSpeeds toChassisSpeeds(diffDrWheelSpeeds)		Re	st Pr	or Che
	DIFFERENTIAL DRIVE KINEMATI	X X Implemented	X Documented	Not WPILIB	X Wenu Item	X - Execution Optimized	X X Test Ro	ChassisSpeeds_New.vi VI Name DiffKinematics_New.vi DiffKinematics_toChassisSpeed.vi	Function Prototype diffDriveKine new(double trackWidth) chassisSpeeds toChassisSpeeds(diffDrWheelSpeeds)		Re	st Pr	Error Che
	DIFFERENTIAL DRIVE KINEMATI	X X Implemented	X X Documented	Not WPILIB	X Wenu Item	X - Execution Optimized	X X Test Ro	ChassisSpeeds_New.vi VI Name DiffKinematics_New.vi DiffKinematics_toChassisSpeed.vi	Function Prototype diffDriveKine new(double trackWidth) chassisSpeeds toChassisSpeeds(diffDrWheelSpeeds)		Re	st Pr	Error Che
	DIFFERENTIAL DRIVE KINEMATI	X X Implemented	X X Documented	IB Not WPILIB	X Wenu Item	Optimized 9 × - Execution Optimized 9	X X Test Ro	ChassisSpeeds_New.vi VI Name DiffKinematics_New.vi DiffKinematics_toChassisSpeed.vi	Function Prototype diffDriveKine new(double trackWidth) chassisSpeeds toChassisSpeeds(diffDrWheelSpeeds)		Re	am Test Pr	Error Che
	DIFFERENTIAL DRIVE KINEMATI	X X Implemented	X X Documented	IB Not WPILIB	X Wenu Item	Optimized 9 × - Execution Optimized 9	X X Test Ro	ChassisSpeeds_New.vi VI Name DiffKinematics_New.vi DiffKinematics_toChassisSpeed.vi	Function Prototype diffDriveKine new(double trackWidth) chassisSpeeds toChassisSpeeds(diffDrWheelSpeeds)		Re	st Pr	Checking Error Che
	DIFFERENTIAL DRIVE KINEMATI	X X Implemented	X X Documented	WPILIB Not WPILIB	X Wenu Item	Optimized 9 × - Execution Optimized 9	st Routine X X X Test Ro	ChassisSpeeds_New.vi VI Name DiffKinematics_New.vi DiffKinematics_toChassisSpeed.vi DiffKinematics_toWheelSpeed.vi	Function Prototype diffDriveKine new(double trackWidth) chassisSpeeds toChassisSpeeds(diffDrWheelSpeeds) diffDriveWheelSpeed toWheelSpeeds(chassisSpeeds)	Notes	e Review Code Re	st Program Test Pr	Checking Error Che
		X S S S S S S S S S S S S S S S S S S S	X Documented	Not WPILIB Not WPILIB	X Wenu Item	X - Execution Optimized	st Routine X X X Test Ro	ChassisSpeeds_New.vi VI Name DiffKinematics_New.vi DiffKinematics_toChassisSpeed.vi DiffKinematics_toWheelSpeed.vi	Function Prototype diffDriveKine new(double trackWidth) chassisSpeeds toChassisSpeeds(diffDrWheelSpeeds)	Notes	Re	am Test Pr	Error Che
	DIFFERENTIAL DRIVE KINEMATI	X S S S S S S S S S S S S S S S S S S S	Documented X X X Documented	X Not WPILIB	X Wenu Item	Execution Optimized	st Routine X X X Test Ro	ChassisSpeeds_New.vi VI Name DiffKinematics_New.vi DiffKinematics_toChassisSpeed.vi DiffKinematics_toWheelSpeed.vi	Function Prototype diffDriveKine new(double trackWidth) chassisSpeeds toChassisSpeeds(diffDrWheelSpeeds) diffDriveWheelSpeed toWheelSpeeds(chassisSpeeds)	Notes Notes DONT NEED	e Review Code Re	st Program Test Pr	Checking Error Che
		X S CS C	Documented X X X Documented	X Not WPILIB	Menu Item X X Menu Item	Execution Optimized	st Routine X X X Test Ro	ChassisSpeeds_New.vi VI Name DiffKinematics_New.vi DiffKinematics_toChassisSpeed.vi DiffKinematics_toWheelSpeed.vi VI Name DiffOdometry_Execute.vi	Function Prototype diffDriveKine new(double trackWidth) chassisSpeeds toChassisSpeeds(diffDrWheelSpeeds) diffDriveWheelSpeed toWheelSpeeds(chassisSpeeds) Function Prototype pose2d update(rotation2d gyro, double leftdist, double right dist)	Notes Notes DONT NEED	e Review Code Re	st Program Test Pr	Checking Error Che
		X S CS C	Documented X X X Documented	X Not WPILIB	Menu Item X X Menu Item	Execution Optimized	st Routine X X X Test Ro	ChassisSpeeds_New.vi VI Name DiffKinematics_New.vi DiffKinematics_toChassisSpeed.vi DiffKinematics_toWheelSpeed.vi VI Name DiffOdometry_Execute.vi	Function Prototype diffDriveKine new(double trackWidth) chassisSpeeds toChassisSpeeds(diffDrWheelSpeeds) diffDriveWheelSpeed toWheelSpeeds(chassisSpeeds) Function Prototype pose2d update(rotation2d gyro, double leftdist, double right dist) diffDrOdom new(rotation gyro, pose initial)	Notes Notes DONT NEED	e Review Code Re	st Program Test Pr	Checking Error Che
		X S CS C	Documented X X X Documented	X Not WPILIB	Menu Item X X Menu Item	Execution Optimized	st Routine X X X Test Ro	ChassisSpeeds_New.vi VI Name DiffKinematics_New.vi DiffKinematics_toChassisSpeed.vi DiffKinematics_toWheelSpeed.vi VI Name DiffOdometry_Execute.vi	Function Prototype diffDriveKine new(double trackWidth) chassisSpeeds toChassisSpeeds(diffDrWheelSpeeds) diffDriveWheelSpeed toWheelSpeeds(chassisSpeeds) Function Prototype pose2d update(rotation2d gyro, double leftdist, double right dist)	Notes Notes DONT NEED	e Review Code Re	st Program Test Pr	Checking Error Che

FRC LabVIEW Trajectory Library – VI Implementation List Revision 2.X 5/24/2022 – After documentation update. Function Prototype Notes **DIFFERENTIAL DRIVE WHEEL SPEEDS** diffDrWheelSpeeds new() diffDrWheelSpeeds new(double leftVel, double rightVel) X X XX DiffWheel Normalize.vi void normalize(double maxVel) Function Prototype Notes MECANUM DRIVE KINEMATICS X Χ MecaKinematics New.vi Χ X Χ MecaKinematics SetInverseKinematics.vi X X Χ MecaKinematics ToChassisSpeeds.vi X X X X Χ MecaKinematics ToWheelSpeeds.vi Χ MecaKinematics_ToWheelSpeedsZeroCenter.vi Function Prototype Notes MECANUM DRIVE MOTOR VOLTAGE Function Prototype Notes MECANUM DRIVE ODOMETRY MecaOdometry_Execute.vi Χ X X X X X X X X MecaOdometry_GetKinematics.vi MecaOdometry_GetPose.vi X Χ X Χ MecaOdometry_New.vi Χ MecaOdometry_NewDefaultPose.vi XX Χ MecaOdometry_Reset.VI XX Χ MecaOdometry_Update.vi XX Χ MecaOdometry UpdateWithTime.vi Function Prototype Notes MECANUM DRIVE WHEEL SPEEDS X MecaWheel New.Vi public MecanumDriveWheelSpeeds(double

X X X SI

MecaWheel GetAll.vi MecaWheel Normalize.vi frontLeftMetersPerSecond, double frontRightMetersPerSecond, double rearLeftMetersPerSecond, double

rearRightMetersPerSecond)

public void normalize(double

attainableMaxSpeedMetersPerSecond)

FRC LabVIEW Trajectory Library – VI Implementation List Revision 2.X 5/24/2022 - After documentation update Execution Optimized Routine Venu Item Not Function Prototype SWERVE DRIVE KINEMATICS X X SwerveKinematics New4.VI For 4 module drives Χ Χ XX SwerveKinematics NewX.VI uses array as input X X Χ SwerveKinematics NormalizeWheelSpeeds.vi public static void normalizeWheelSpeeds(SwerveModuleState[] moduleStates, double attainableMaxSpeedMetersPerSecond) X X X X SwerveKinematics_ToChassisSpeeds4.VI For 4 module drives X $X \mid X \mid X$ SwerveKinematics ToChassisSpeedsX.VI uses array as input SwerveKinematics ToSwerveModuleStates.VI public SwerveModuleState[] toSwerveModuleStates(ChassisSpeeds chassisSpeeds, Translation2d centerOfRotationMeters) SwerveKinematics ToSwerveModuleStatesZeroCenter.VI public SwerveModuleState[] toSwerveModuleStates(ChassisSpeeds chassisSpeeds) variable parameters (replace with public SwerveDriveKinematics(Translation2d... wheelsMeters) array and "4" calls) public ChassisSpeeds toChassisSpeeds(SwerveModuleState... variable parameters (replace with array and "4" calls) lenu Item Function Prototype VI Name Notes SWERVE DRIVE ODOMETRY SwerveOdometry_Execute4.vi SwerveOdometry_ExecuteX.vi Χ X SwerveOdometry_GetPosition.VI public Pose2d getPoseMeters() X Χ Χ SwerveOdometry New.VI public SwerveDriveOdometry(SwerveDriveKinematics kinematics, Rotation2d gyroAngle, Pose2d initialPose) X X SwerveOdometry NewZeroCenter.VI public SwerveDriveOdometry(SwerveDriveKinematics kinematics, X 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 $X \mid X \mid X \mid X$ SwerveOdometry UpdateWithTimeX.VI uses array as input X X X X SwerveOdometry_UpdateX.VI uses array as input public Pose2d updateWithTime(double currentTimeSeconds, variable parameters (replace with Rotation2d gyroAngle, SwerveModuleState... moduleStates) array and "4" calls) variable parameters (replace with public Pose2d update(Rotation2d gyroAngle, SwerveModuleState... moduleStates) array and "4" calls) ltem / Function Prototype Notes SWERVE DRIVE MODULE STATE X SwerveModuleState CompareTo.vi public int compareTo(SwerveModuleState o) X X SI

Χ

X

X

Χ

X

X

X SI

X

SI

SI

SwerveModuleState Get.vi

SwerveModuleState New.vi

SwerveModuleState_Optimize.vi

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

FRC_LabVIEW_Trajectory_Library_Routines.xlsx

public SwerveModuleState(double speedMetersPerSecond,

public SwerveModuleState optimize(SwerveModuleState desired,

Rotation2d angle)

Rotation2d angle)

SPLINE HELPER X

Χ X X

Χ

FRC LabVIEW Trajectory Library - VI Implementation List Revision 2.X 5/24/2022 - After documentation update Execution Optim Routine Function Prototype Notes **CUBIC HERMITE SPLINE** protected SimpleMatrix getCoefficients() not needed, use cluster unpack Χ CubicHermiteSpline_getControlVectorFromArrays.vi private SimpleMatrix getControlVectorFromArrays(double[] X initialVector, double[] finalVector)
private SimpleMatrix makeHermiteBasis() X CubicHermiteSpline_makeHermiteBasis.vi X X public CubicHermiteSpline(double[] xInitialControlVector, double[] xFinalControlVector, double[] yInitialControlVector, double[] X CubicHermiteSpline_New.vi yFinalControlVector) Function Prototype VI Name Notes POSE WITH CURVATURE public PoseWithCurvature(Pose2d poseMeters, double PoseWithCurve New.vi curvatureRadPerMeter) public PoseWithCurvature() can use cluster constant public Pose2d poseMeters not needed, use cluster unpack public double curvatureRadPerMeter. not needed, use cluster unpack Function Prototype Notes QUINTIC HERMITE SPLINE X private SimpleMatrix getControlVectorFromArrays(double[] QuinticHermiteSpline getControlVectorFromArrays.vi initialVector, double[] finalVector)
private SimpleMatrix makeHermiteBasis() Χ X QuinticHermiteSpline makeHermiteBasis.vi public QuinticHermiteSpline(double[] xInitialControlVector, double[] xFinalControlVector, double[] yInitialControlVector, X X Χ QuinticHermiteSpline New.vi double[] yFinalControlVector)
protected SimpleMatrix getCoefficients() not needed, use cluster unpack Function Prototype VI Name Notes SPLINE (Abstract class) 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 Checking g ltem Routin est

SplineHelp_GetCubicCtrlVector.vi

SplineHelp GetCubicCtrlVectorsFromWayPts.vi

Function Prototype

scalar, Pose2d point)

private static Spline.ControlVector getCubicControlVector(double

public static Spline.ControlVector[]
getCubicControlVectorsFromWaypoints(Pose2d start,

Translation2d[] interiorWaypoints, Pose2d end)

Notes

X	Χ	$X \mid X$			SplineHelp_GetCubicCtrlVectorsFromWeightedWayPts.vi			
X	Χ	X No			SplineHelp_GetCubicSpline_Calc1.vi		internal	
X	Χ	X No			SplineHelp_GetCubicSpline_Calc2.vi		internal	
X	Χ	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	Χ	X	SI		SplineHelp_GetQuinticCtrlVector.vi	private static Spline.ControlVector getQuinticControlVector(double scalar, Pose2d point)		
					SplineHelp_GetQuinticCtrlVectorsFromWayPts.vi	public static List <spline.controlvector> getQuinticControlVectorsFromWaypoints(List<pose2d> waypoints)</pose2d></spline.controlvector>	REMOVED 2762	
					SplineHelp_GetQuinticCtrlVectorsFromWeightedWayPts.vi		REMOVED 2762	
X	X	X			SplineHelp_getQuinticSplinesFromControlVectors.vi	public static QuinticHermiteSpline[] getQuinticSplinesFromControlVectors(Spline.ControlVector[] controlVectors)		
X	Χ	XX			SplineHelp_GetQuinticSplinesFromWeightedWayPts.vi	•	New 2762	
X	Χ	X			SplineHelp_GetQuinticSplinesFromWayPts.vi		New 2762	
X	Χ	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	Code Review	Test Program	Error Checking
SPLINE PARAMETERIZER	X	X		X				SplineParam_Spline_T0_T1.vi	public static List <posewithcurvature> parameterize(Spline spline double t0, double t1)</posewithcurvature>				
	X	X		X		X		SplineParam_Spline.vi	public static List <posewithcurvature> parameterize(Spline spline)</posewithcurvature>				
	Χ	Χ	Χ	No				SplineParam_StackGet.vi		internal			
	Χ	Χ	Χ	No				SplineParam_StackPop.vi		internal			
	X	X	X	No				SplineParam StackPush vi		internal			

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

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	 VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
TRAJECTORY		X		Χ		Trajectory_Concatenate.vi					
	X	X		Χ		Trajectory_equals.vi	boolean equals(other obj)	FUTURE			
	X	X		Χ	SI	Trajectory_GetStates.vi	public List <state> getStates()</state>	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			
	Χ	X		Χ	SI	Trajectory_New_Empty.vi	·				
	Χ	X		Χ	SI	Trajectory_New.vi	public Trajectory(final List <state> states)</state>				
	Χ	X		Χ		Trajectory_RelativeTo.vi	public Trajectory relativeTo(Pose2d pose)				
	Χ	X		Χ		Trajectory_Sample.vi	public State sample(double timeSeconds)				
	X	X	X	X		Trajectory_SampleReverse.vi		Sample in reverse order. Negate sample.			
	Χ	X		Χ		Trajectory_TransformBy.vi	public Trajectory transformBy(Transform2d transform)				
							public Pose2d getInitialPose()	can use cluster unpack, array index			

FRC_LabVIEW_Trajectory_Library_Routines.xlsx Page 16 / 38

cumentation update.	LISI								_				
estation apado.	Q	J.			Optimized	ø,	gram				×	٤	ing
	Implemented	Documented	Not WPILIB	Menu Item	Execution O	Test Routine	Sample Program				Code Review	Program	r Checking
	nple	700	10t 1	Jeni	ž.	est	am	VI Name	Function Prototype	Notes	3000	Test	Error
TRAJECTORY_STATE		X	_ <	_ <u> </u>	SI			TrajectoryState_Equals.vi	boolean equals(other obj)	Notes			Ш
	X	X	X		SI			TrajectoryState GetAll.vi					
	X	X		X				TrajectoryState_GetPose.vi					
	X	X		X				TrajectoryState_Interpolate.vi	State interpolate(State endValue, double i)				
	X	X		X	SI			TrajectoryState_New.vi	public State(double timeSeconds, double velocityMetersPerSecond, double accelerationMetersPerSecondSq, Pose2d poseMeters, double curvatureRadPerMeter)				
l					ized		-		public State()				
	nplemented	Documented	Not WPILIB	Menu Item	Execution Optim	Test Routine	Sample Program				Code Review	Test Program	or Checking
	Jul	Doo	Not	Me	Exe	Tes	Sar	VI Name	Function Prototype	Notes	Co	7es	Error
TRAJECTORY CONFIG	X	X		X				TrajectoryConfig_AddConstraint.vi TrajectoryConfig_AddConstraints.vi	public TrajectoryConfig addConstraint(TrajectoryConstraint constraint)	Implemented differently, can't duplicate.			
	X	X		X	SI			TrajectoryConfig_Create.vi	public TrajectoryConfig addConstraints(List extends TrajectoryConstraint constraints) public TrajectoryConfig(double maxVelocityMetersPerSecond,	Implemented differently, can't duplicate.			
									double maxAccelerationMetersPerSecondSq)				
	X	X		X				TrajectoryConfig_GetCentripetalAccel.vi					
	X	X	X	X				TrajectoryConfig_GetConstraints.vi	public List <trajectoryconstraint> getConstraints()</trajectoryconstraint>	Implemented differently, can't duplicate.			
	X	Χ		X				TrajectoryConfig_GetEndVelocity.vi	public double getEndVelocity()	can use cluster unpack			
	X	X		X				TrajectoryConfig_GetKinematicsDiffDrive.vi					
	X	X		X				TrajectoryConfig_GetKinematicsMecanumfDrive.vi					
	X	X	X	X				TrajectoryConfig_GetKinematicsSwerveDrive.vi TrajectoryConfig_GetMaxVelAccel.vi					
	X	X		$\frac{\lambda}{X}$				TrajectoryConfig_GetStartVelocity.vi	public double getStartVelocity()	can use cluster unpack			
	X	X		X				TrajectoryConfig_GetVoltageDiffDrive.vi	pasio deasis geterative seeing ()	San des states anjaces			
	Χ	Χ		X				TrajectoryConfig_IsReversed.vi	public boolean isReversed()	can use cluster unpack			
	X	X	X		SI			TrajectoryConfig_setCentripetalAccel.vi					
	X	X		X	SI			TrajectoryConfig_SetEndVelocity.vi TrajectoryConfig_setKinematicsDiffDrive.vi	public TrajectoryConfig setEndVelocity(double endVelocityMetersPerSecond) public TrajectoryConfig setKinematics(DifferentialDriveKinematics				
								, , , , , , , , , , , , , , , , , , , ,	kinematics)				
	X			X		_		TrajectoryConfig_setKinematicsMecanumfDrive.vi	public TrajectoryConfig setKinematics(MecanumDriveKinematics kinematics) public TrajectoryConfig setKinematics(SwerveDriveKinematics				
	X	X		X	SI			TrajectoryConfig_setKinematicsSwerveDrive.vi	kinematics)				
•	X	X		X	SI			TrajectoryConfig_setReversed.vi TrajectoryConfig_SetStartVelocity.vi	public TrajectoryConfig setReversed(boolean reversed) public TrajectoryConfig setStartVelocity(double				
	X		X		SI			TrajectoryConfig_setVoltageDiffDrive.vi	startVelocityMetersPerSecond)				
					<u> </u>			Trajocary Cornig_Corv orange Empire.vi	public double getMaxVelocity()	Created function to return both			
									public double getMaxAcceleration()	Created function to return both			
					70				NOTE ADD OTHER "SET" ROUTINES FOR OTHER CONTRAINTS HERE, SINCE NEW CONTRAINTS ARE SPECIFIC AND NOT GENERIC.				
	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimizec	Test Routine	Sample Program				Code Review	Test Program	Error Checking
	LI I	Ã	ž	S	Ŵ	7	ιχ	VI Name	Function Prototype	Notes	Ŏ	ř	Ē

RC LabVIEW Trajectory Library – VI Implementation I	_ist											
evision 2.X 5/24/2022 – After documentation update.												1
TRAJECTORY GENERATE		X		X			TrajectoryGenerate_Make_Cubic_CtrlVect.vi	initial, List <translation2d> interiorWaypoints, Spline,ControlVector</translation2d>				
	X			X			TrajectoryGenerate_Make_Cubic.vi	end, TrajectoryConfig config) public static Trajectory generateTrajectory(Pose2d start, List <translation2d> interiorWaypoints, Pose2d end, TrajectoryConfig config)</translation2d>	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	controlVectors, TrajectoryConfig config)	uses quintic splines			
	X	X	X				TrajectoryGenerate_Make_Quintic_Weighted.vi		New 2762			
	X	X		X			TrajectoryGenerate_Make_Quintic.vi TrajectoryGenerate_splinePointsFromSplines.vi	public static Trajectory generateTrajectory(List <pose2d> waypoints, TrajectoryConfig config) public static List<posewithcurvature> splinePointsFromSplines(Spline[] splines)</posewithcurvature></pose2d>	uses quintic splines			
	Implemented	Documented	t WPILIB	lenu Item	Execution Optimized	est Routine	mple Program			Code Review	st Program	or Checking
	μ	Ď	Not	Me	ËX	je je	VI Name	Function Prototype	Notes	Š	Test	Err
TRAJECTORY GENERATE (Control Vector)									may not need, just data			
									may not need, just data			
								<pre>public ControlVectorList(Collection<? extends Spline.ControlVector> collection)</pre>	may not need, just data			
	Implementea	ocumentec	Vot WPILIB	Menu Item	Execution Opt	Test Routine	NI Name	Function Prototype	Notes	Code Reviel	Test Prograi	Error Checking
TRAJECTORY PARAMETERIZE	_	X			Щ	<u> </u>	TrajectoryParam calcStuffFwd.vi	Function Prototype	Notes	0	<u> </u>	<u>w</u> _
THAT OF THE PARTIES AND THE PA	X	X					TrajectoryParam calcStuffRev.vi					
	X	X		No			TrajectoryParam_enforceAccel.vi	private static void enforceAccelerationLimits(boolean reverse, List <trajectoryconstraint> constraints, ConstrainedState state)</trajectoryconstraint>	This routines needs to be changed when new constraints are added.			
	X	X	X	100			TrajectoryParam_enforceVelocity.vi		This routines needs to be changed when new constraints are added.			
	X	X		X			TrajectoryParam_timeParam.vi	public static Trajectory timeParameterizeTrajectory(List <posewithcurvature> points. List<trajectoryconstraint> constraints, double startVelocityMetersPerSecond, double endVelocityMetersPerSecond, double maxVelocityMetersPerSecond, double maxAccelerationMetersPerSecondSq, boolean reversed)</trajectoryconstraint></posewithcurvature>				
	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	NI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
TRAJECTORY PARAMETERIZE CONSTRAINED STATE		X		X			ConstrainedState_New.vi	ConstrainedState(PoseWithCurvature pose, double distanceMeters, double maxVelocityMetersPerSecond, double minAccelerationMetersPerSecondSq, double maxAccelerationMetersPerSecondSq)				
				X			ConstrainedState_SetMaxAccel.vi ConstrainedState_SetMinAccel.vi	<u>"</u>				
l de la companya de	\/					1	L'OUSTRAIDEGSTATE SETMINACCELVI	1	1		I	1
	X	X	X	X			ConstrainedState_SetVelAccel.vi					
	Χ	Χ	X					ConstrainedState()				

Page 18 / 38 FRC_LabVIEW_Trajectory_Library_Routines.xlsx

Revision 2.X 5/24/2022 – After documentation update.										
TRAJECTORY UTIL	X X Implemented	X X Documented	X	X X Wenu Item	X X Execution Optimized	Test Routine		TrajectoryUtil_fromPathWeaverJSON.vi pub TrajectoryUtil_MakeWeightedWayPoint_ENG.vi TrajectoryUtil_MakeWeightedWayPoint.vi TrajectoryUtil_toPathWeaverJSON.vi pub pati	blic static Trajectory fromPathweaverJson(Path path) blic static void toPathweaverJson(Trajectory trajectory, Path	Notes
TRAPEZOID PROFILE	X X Implemented	X X Documented	Not WPILIB	X Menu Item	Execution Optimized	Test Routine		VI Name Fur TrapProfConstraint_New.vi TrapProfile_Calculate.vi	inction Prototype	Notes
	X X X X X X X X X X	X X X X X X X X X X	X X	No X X X X X No X X X X X X X X X	SI			TrapProfile_Direct.vi TrapProfile_Execute_vi TrapProfile_Execute_AtGoal.vi TrapProfile_IsFinished.vi TrapProfile_New_DefInitial.vi TrapProfile_New.vi TrapProfile_ShouldFlipAcceleration.vi TrapProfile_TimeLeftUntil.vi TrapProfile_TotalTime.vi TrapProfState_Equals.vi TrapProfState_New.vi		Private, remove from menu Private, remove from menu
'======= TRAJECTORY CONSTRAINT '========	X	X		X				TrapProtState_New.vi		
CENTRIPETAL ACCELERATION CONSTRAINT	X Implemented	X Documented	Not WPILIB	X Menu Item	Execution Optimized	Test Routine		CentripetalAccelConstraint_getMaxVelocity.vi pub pos velo	inction Prototype blic double getMaxVelocityMetersPerSecond(Pose2d seMeters, double curvatureRadPerMeter, double locityMetersPerSecond) blic MinMax	Notes
	X			X	SI			get dou	tMinMaxAccelerationMetersPerSecondSq(Pose2d poseMeters, uble curvatureRadPerMeter, double velocityMetersPerSecond)	Can use cluster pack for now
DIFF DRIVE KINEMATIC CONSTRAINT	Implemented	X Documented	Not WPILIB	X Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name Fur DiffDriveKinematicsConstraint_getMaxVelocity.vi pub	axCentripetalAccelerationMetersPerSecondSq)	Notes

FRC_LabVIEW_Trajectory_Library_Routines.xlsx Page 19 / 38

022 – After documentation update.									-	
'	Χ	Χ		X				DiffDriveKinematicsConstraint_getMinMaxAccel.vi	public MinMax getMinMaxAccelerationMetersPerSecondSq(Pose2d poseMeters,	
									double curvatureRadPerMeter, double velocityMetersPerSecond)	
	X	Χ		X	SI			DiffDriveKinematicsConstraint_New.vi	public DifferentialDriveKinematicsConstraint(final DifferentialDriveKinematics kinematics, double maxSpeedMetersPerSecond)	
DIFF DRIVE VOLTAGE CONSTRAINT	imes Implemented	X Documented	Not WPILIB	X Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name DiffDriveVoltageConstraint_getMaxVelocity.vi	Function Prototype public double getMaxVelocityMetersPerSecond(Pose2d poseMeters, double curvatureRadPerMeter, double	Notes
									velocityMetersPerSecond)	
	X	X		X				DiffDriveVoltageConstraint_getMinMaxAccel.vi	public MinMax getMinMaxAccelerationMetersPerSecondSq(Pose2d poseMeters, double curvatureRadPerMeter, double velocityMetersPerSecond)	
	X	Χ		X	SI			DiffDriveVoltageConstraint_New.vi	public DifferentialDriveVoltageConstraint(SimpleMotorFeedforward feedforward, DifferentialDriveKinematics kinematics, double maxVoltage)	
ELLIPTICAL REGION CONSTRAINT	X Implemented	X Documented	Not WPILIB	X Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name EllipRegionConstraint_getMaxVelocity.vi	Function Prototype	Notes
	X	X		X				EllipRegionConstraint_getMinMaxAccel.vi EllipRegionConstraint_IsPoseInRegion.vi		
	\overline{X}	$\frac{\lambda}{X}$		X				EllipRegionConstraint_Isr osernitegion.vi		
	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name		Notes
JERK CONSTRAINT	/		X					JerkConstraint_getMaxVelocity.vi	Routine exists, it is just a shell	FUTURE
	/		X		SI			JerkConstraint_getMinMaxAccel.vi JerkConstraint_New.vi	Routine exists, it is just a shell Routine exists, it is just a shell	FUTURE FUTURE
	Implemented	Documented	WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program			
MAX VELOCITY CONSTRAINT	<u> </u>		Not	X	∭ SI		Š	VI Name MaxVelocityConstraint_getMaxVelocity.vi	Function Prototype	Notes
WIAX VELOCITY CONSTRAINT	X	X		X	SI			MaxVelocityConstraint_getMaxVelocity.vi MaxVelocityConstraint_getMinMaxAccel.vi		
	X	X		X	SI			MaxVelocityConstraint_New.vi		

FRC_LabVIEW_Trajectory_Library_Routines.xlsx Page 20 / 38

5/24/2022 – After documentation update.										
					jeq.					
					Optimized		ш			
	g	ō	~		Dpti	Ō	Program			
	nte	nte	7.16	E	ž	ıţi	Pro			
	шe	me	ΝĐ	ı Ite	utic	Ro)e			
	Implemented	Documented	Not WPILIB	Menu Item	Execution	Test Routine	Sample			
ŗ			ž		ш	9	Š		unction Prototype	Notes
MECANUM DRIVE KINEMATICS CONSTRAINT	X	X		X				MecaDriveKinematicsConstraint_getMaxVelocity.vi		
	X	X		X	SI			MecaDriveKinematicsConstraint_getMinMaxAccel.vi MecaDriveKinematicsConstraint_New.vi		
l.					SI			wecaDriveKinematicsConstraint_New.vi		
					g					
					Optimized		4			
	_	_			otin		Program			
	ţec	tea	IB	2		ine	õ			
	Jer	nen	ΡIΓ	Iter	ion	mo	еЪ			
	je	З'n	3	nu	cu	# E	Ιdu			
	Implementea	Documentea	Not WPILIB	Menu Item	Execution	Test Routine	Sample	VI Name Fo	Function Prototype	Notes
RECTANGULAR REGION CONSTRAINT	Χ	Χ		X				RectRegionConstraint_getRectRegion.vi	· ·	
	Χ	Χ		X				RectRegionConstraint_getMinMaxAccel.vi		
	Χ	X		X				RectRegionConstraint_IsPoseInRegion.vi		
	Χ	Χ		X				RectRegionConstraint_New.vi		
					7-					
					Optimized					
					ţį		Program			
	eq	þe	m		Ó	<u> </u>	go			
	ent	ente	7	em		ŭ	ď			
	eu	Ĕ	Χ	u It	ŭ	æ	ble			
	Implementea	Documente	Not WPILIB	Menu Item	Execution	Test Routine	Sample	VI Name Fi	Function Prototype	Notes
SWERVE DRIVE KINEMATICS CONSTRAINT	<u> </u>	X	_ <	_ <u><</u>	Щ		0)		unction Prototype ublic double getMaxVelocityMetersPerSecond(Pose2d	Notes
OWERVE BRIVE RINEMATION CONCINCAINT	^			_ ^				books verification and statistic general verifications of the property of the	poseMeters, double curvatureRadPerMeter, double	
								Ve	relocityMetersPerSecond)	
	X	X		X				SwerveDriveKinematicsConstraint_getMinMaxAccel.vi	oublic MinMax	
								g.	petMinMaxAccelerationMetersPerSecondSq(Pose2d poseMeters, louble curvatureRadPerMeter, double velocityMetersPerSecond)	
	X	X		X	SI			SwerveDriveKinematicsConstraint_New.vi	Newpublic SwerveDriveKinematicsConstraint(final	Can use cluster pack for now
								Sim	SwerveDriveKinematics kinematics, double naxSpeedMetersPerSecond)	
									naxopeedivieters/ ersecond/	
					Б					
					timized		am			
	75	7-			ptir	as.				
	ıteα	πec	18	8	0	tine	Progr			
	иe	ner	Į,	lte.	ţį	Sou	le F			
	Implemented	Documented	Not WPILIB	Menu Item	Execution Opt	Test Routine	Sample			
					_ <u>``</u>		Sa		Function Prototype	Notes
TRAJECTORY CONSTRAINT	Χ		X	X				TrajConstraint_GetMaxVelocity.vi		
	X	X	X					TrajConstraint_GetMinMaxAccel.vi		
l	Χ	X	X	X				TrajConstraint_GetType.vi		
					Ø					
					ıize		2			
	_				Optimizea		ıran			
	itea	ted	18	2		ine	Progr			
	nen	ner	Ы	lten	tion	out	e D			
	Implemented	Documente	Not WPILIB	Menu Item	Execution	Test Routine	Sample			
	duı	ρŏ	Not	Me	Exe	<i>Tes</i>	Sar	VI Name Fi	Function Prototype	Notes
TRAJECTORY CONSTRAINT (Min Max)	Χ	Χ		X	SI			Constraint_MinMax_New.vi C	Constraint_MinMax_New	
. (Χ	X		X	SI				Constraint_MinMax_New	

'========= UTILITY

'======

THESE ROUTINES ARE SPECIFIC TO LABVIEW. THEY DO NOT HAVE A

FRC_LabVIEW_Trajectory_Library_Routines.xlsx

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
UTIL	Χ	Χ	X	X	SI			Util_ApproxEqual.vi		
	Χ	Χ	Χ	Х				Util_Array_PoseWCurv_to_XY.vi		
	Χ	Χ	X	X	SI			Util_CalcDist.vi		
	Χ	Χ	X	X	SI			Util_GetLibraryVersion.vi		
	Χ	Χ	X	X	SI			Util_GetLibUsage.vi		
	X	X	X	X				Util_GetTime.vi		Once tested completely, this should be optimized!
	Χ	Χ	X	No	N/A			Util_LibraryGlobals.vi		Global Variables – no block diag.
	Χ	Χ	Χ	Χ				Util_Trajectory_Absolute_To_Relative.vi		
	Χ	Χ	X	X				Util_Trajectory_ReadFile.vi		
	Χ	Χ	X	X				Util_Trajectory_to_XY.vi		
	X	Χ	X	No				Util_Trajectory_WriteFile_Config.vi		internal
	X	Χ	X	No				Util_Trajectory_WriteFile_OneState.vi		internal
	Χ	Χ	X	X				Util_Trajectory_WriteFile_PathFinder.vi		
	Χ	Χ	X	No				Util_Trajectory_WriteFile_PathFinderConfig.vi		internal
	X	Χ	X	X				Util_Trajectory_WriteFile_Pathweaver.vi		
	X	Χ	X	No				Util_Trajectory_WriteFile_States.vi		internal
	X	Χ	X	No				Util_Trajectory_WriteFile_WayPoints.vi		internal
	X	Χ	X	X				Util_Trajectory_WriteFile.vi		
	X	Χ	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	Χ	X	No				Util_DispWeightedWayPoint_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	Χ	Χ	Χ	Χ	SI			Conv_AngleDegrees_Heading.vi		
	Χ	Χ	Χ	Χ	SI			Conv_AngleRadians_Heading.vi		
	Χ	Χ	Χ	Χ	SI			Conv_Centimeters_Meters.vi		
	Χ	X	Χ	Χ	SI			Conv_Deg_Radians.vi		
	Χ	X	Χ	Χ	SI			Conv_Deg_Rotations.vi		
	Χ	X	X	X	SI			Conv_Feet_Meters.vi		
_	X	X	X	Χ	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 SI			Conv_Pounds_Kilograms.vi Conv_Radians_Deg.vi		
	\hat{X}	X	X	X	SI			Conv Radians Rotations.vi		
	\overline{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		

FRC_LabVIEW_Trajectory_Library_Routines.xlsx Page 22 / 38

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name	Function Prototype	Notes
UNITS		X		\overline{X}	SI	, <u> </u>		Units_DegreesToRadians.vi	71	
	Χ	X		X	SI			Units_DegreesToRotations.vi		
	Χ	Χ		X	SI			Units FeetToMeters.vi		
	Χ	Χ		X	SI			Units InchesToMeters.vi		
	Χ	Χ		Χ	SI			Units MetersToFeet.vi		
	Χ	Χ		Χ	SI			Units_MetersToInches.vi		
	Χ	Χ		Χ	SI			Units_MillisecondsToSeconds.vi		
	Χ	Χ		X	SI			Units_RadiansPerSecondToRotationsPerMinute.vi		
	Χ	Χ		Χ	SI			Units_RadiansToDegrees.vi		
	Χ	Χ		X	SI			Units_RadiansToRotations.vi		
	Χ	Χ		X	SI			Units_RotationsPerMinuteToRadiansPerSecond.vi		
	Χ	Χ		X	SI			Units_RotationsToDegrees.vi		
	Χ	Χ		X	SI			Units_RotationsToRadians.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

PATHFINDERUTIL X X X X

Function Prototype Notes PathfinderUtil_Continuous_Heading_Difference.vi
PathfinderUtil_OptimizeTrajectoryStates.vi
PathfinderUtil_ToTrajectory.vi
PathfinderUtil_ToTrajectoryStates.vi

'======= STATE SPACE MODEL '========

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

FRC_LabVIEW_Trajectory_Library_Routines.xlsx Page 23 / 38

X	Χ	Χ	SI	DCMotor_PickMotor.vi		

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

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

> Function Prototype Notes DIFFERENTIAL DRIVE POSE ESTIMATOR X X DiffDrivePoseEst_AddVisionMeasurement.vi X X X X X Χ DiffDrivePoseEst_FillStateVector.vi Χ DiffDrivePoseEst_GetEstimatedPosition.vi X X Χ DiffDrivePoseEst_Kalman_F_Callback.vi X X DiffDrivePoseEst Kalman H Callback.vi Χ XX Χ DiffDrivePoseEst New.vi X X DiffDrivePoseEst_ResetPosition.vi Χ X X Χ DiffDrivePoseEst_SetVisionMeasurementStdDevs.vi X X Χ DiffDrivePoseEst_Update.vi X X X X Χ DiffDrivePoseEst_UpdateWithTime.vi Χ DiffDrivePoseEst_VisionCorrect_Callback.vi XX Χ 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
EXTENDED KALMAN FILTER	X	X		Χ				ExtendedKalmanFilter_Correct_OnlyUY.vi					
	X	X		Χ				ExtendedKalmanFilter_Correct.vi		Just a shell, not functional!			
	X	Χ		Χ				ExtendedKalmanFilter_GetP_Single.vi					
	X	Χ		Χ				ExtendedKalmanFilter_GetP.vi					
	X	Χ		Χ				ExtendedKalmanFilter_GetXHat_Single.vi					
	X	X		Χ				ExtendedKalmanFilter_GetXHat.vi					
	X	X		Χ				ExtendedKalmanFilter_New.vi					
	X	Χ		Χ				ExtendedKalmanFilter_Predict.vi					
		Χ		Χ				ExtendedKalmanFilter_Reset.vi					
	X	Χ		Χ				ExtendedKalmanFilter_SetP.vi					
	X	X		Χ				ExtendedKalmanFilter_SetXHat_Single.vi					
	X	Χ		Χ				ExtendedKalmanFilter_SetXHat.vi					

					imizec		En Control of the Con			60
		Implemented Documented	7.18	8	n Opt	Test Routine	Programme and the state of the	8 Code Review	Test Program	Checking
		Implemente Documente	Not WPILIB	Menu Item	Execution	Rol		. Re	Pro	έ
		nplk Joc	70 <i>t</i> 1	/en	žec	est	ง อัง VI Name Function Prototype Note	ode S	est	Error
KAL	MAN FILTER	$X \mid X$		_ <u><</u>		X	KalmanFilter Correct.vi	<u> </u>		
		XX		X			KalmanFilter_GetK			
		XX		X			KalmanFilter_GetK_Single.vi KalmanFilter_GetXHat			
		X X X X		X		X	KalmanFilter_GetXHaT_Single			
		X X		X		X	KalmanFilter_New.vi			
		X X		X		Χ	KalmanFilter_Predict.vi			
		XX		X			KalmanFilter_Reset.vi			
		X X X X		X		X	KalmanFilter_SetXHat KalmanFilter_SetXHat_Single			
					pəz					
					timi		in the state of th			ğ
		ted ted	9	,	ô	ine	Ď.	iew W	ram	ckir
		Implemented Documented	Not WPILIB	Menu Item	Execution	Test Routine	Q v	8 Code Revien	. Program	Checking
		cun	7	nu	noe	st R	ତ୍ତି । ଆଧିକ ଓ VI Name Function Prototype Note	qe i	st P	.or (
		<u> </u>			й	, e	VI Name Function Prototype Note	es S	Test	Error
(ALMAN FILTER LATENCY CO		$\begin{array}{c c} X & X \\ \hline X & X \end{array}$	_	X			KalmanFilterLatencyComp_AddObserverState.vi KalmanFilterLatencyComp_ApplyPastGlobalMeas_FuncGroup.vi			
		X X		X			KalmanFilterLatencyComp_ApplyPastGlobalMeasurement_UKF.vi			
		X X		X			KalmanFilterLatencyComp_FindClosestMeasurement.vi			
		$X \mid X$		X			KalmanFilterLatencyComp_New.vi			
		$\begin{array}{c c} X & X \\ \hline X & X \end{array}$		X			KalmanFilterLatencyComp_Observer_New.vi KalmanFilterLatencyComp_Reset vi			
		X X X X		X			KalmanFilterLatencyComp_Observer_New.vi KalmanFilterLatencyComp_Reset.vi			
		X X X X					KalmanFilterLatencyComp_Observer_New.vi			
		X X		X	ptimized	Φ	KalmanFilterLatencyComp_Reset.vi	W	E	ding
		X X		X	Optimized	utine	KalmanFilterLatencyComp_Reset.vi	sview	ıgram	ecking
		X X		X	Optimized	Routine	KalmanFilterLatencyComp_Reset.vi	. Review	Program	· Checking
		X X		X	Optimized	est Routine	KalmanFilterLatencyComp_Reset.vi	code Review	est Program	rror Checking
MECANUM DRIVE POSE		Mplemented X X X X Documented X X X X X X X X X		X	ptimized	Test Routine	KalmanFilterLatencyComp_Reset.vi Function Prototype Note	se Code Review	Test Program	Error Checking
MECANUM DRIVE POSE	ESTIMATOR _	X X X X X X	Not WPILIB	X Menu Item	Execution Optimized	Test Routine	KalmanFilterLatencyComp_Reset.vi VI Name Function Prototype Note MecaDrivePoseEst_AddVisionMeasurement_StdDev.vi MecaDrivePoseEst_AddVisionMeasurement.vi	Code Review	Test Program	Error Checking
MECANUM DRIVE POSE	ESTIMATOR	X X X X X Documented X X X	Not WPILIB	X X Wenu Item	Execution Optimized	Test Routine	KalmanFilterLatencyComp_Reset.vi VI Name Function Prototype Note MecaDrivePoseEst_AddVisionMeasurement_StdDev.vi MecaDrivePoseEst_AddVisionMeasurement.vi MecaDrivePoseEst_GetEstimatedPosition.vi	So Code Review	Test Program	Error Checking
MECANUM DRIVE POSE	ESTIMATOR	X X X X X X X X X X X X X X X X X X X	Not WPILIB	X X Wenu Item	Execution Optimized	Test Routine	KalmanFilterLatencyComp_Reset.vi VI Name Function Prototype Note MecaDrivePoseEst_AddVisionMeasurement_StdDev.vi MecaDrivePoseEst_AddVisionMeasurement.vi MecaDrivePoseEst_GetEstimatedPosition.vi MecaDrivePoseEst_Kalman_F_Callback.vi	se Code Review	Test Program	Error Checking
MECANUM DRIVE POSE	ESTIMATOR	X X X X X X X X X X X X X X X X X X X	Not WPILIB	X X No No No	Execution Optimized	Test Routine	KalmanFilterLatencyComp_Reset.vi VI Name Function Prototype Note MecaDrivePoseEst_AddVisionMeasurement_StdDev.vi MecaDrivePoseEst_AddVisionMeasurement.vi MecaDrivePoseEst_GetEstimatedPosition.vi MecaDrivePoseEst_Kalman_F_Callback.vi MecaDrivePoseEst_Kalman_H_Callback.vi	se Code Review	Test Program	Error Checking
MECANUM DRIVE POSE	ESTIMATOR	X X X X X X X X X X X X X X X X X X X	Not WPILIB	X X No No X X X	Execution Optimized	Test Routine	KalmanFilterLatencyComp_Reset.vi VI Name Function Prototype Note MecaDrivePoseEst_AddVisionMeasurement_StdDev.vi MecaDrivePoseEst_AddVisionMeasurement.vi MecaDrivePoseEst_GetEstimatedPosition.vi MecaDrivePoseEst_Kalman_F_Callback.vi MecaDrivePoseEst_Kalman_F_Callback.vi MecaDrivePoseEst_New.vi MecaDrivePoseEst_New.vi MecaDrivePoseEst_ResetPosition.vi	Se Code Review	Test Program	Error Checking
MECANUM DRIVE POSE	ESTIMATOR	X X X X X X X X X X X X X X X X X X X	Not WPILIB	X X X X X X X X X X X X X X X X X X X	Execution Optimized	Test Routine	KalmanFilterLatencyComp_Reset.vi VI Name Function Prototype Note MecaDrivePoseEst_AddVisionMeasurement_StdDev.vi MecaDrivePoseEst_AddVisionMeasurement_vi MecaDrivePoseEst_GetEstimatedPosition.vi MecaDrivePoseEst_Kalman_F_Callback.vi MecaDrivePoseEst_Kalman_H_Callback.vi MecaDrivePoseEst_New.vi MecaDrivePoseEst_ResetPosition.vi MecaDrivePoseEst_ResetPosition.vi MecaDrivePoseEst_ResetPosition.vi MecaDrivePoseEst_SetVisionMeasurementStdDevs.vi	Sode Review	Test Program	Error Checking
MECANUM DRIVE POSE	ESTIMATOR		Not WPILIB	X X X No No X X X X X	Execution Optimized	Test Routine	KalmanFilterLatencyComp_Reset.vi Function Prototype Note MecaDrivePoseEst_AddVisionMeasurement_StdDev.vi MecaDrivePoseEst_AddVisionMeasurement.vi MecaDrivePoseEst_GetEstimatedPosition.vi MecaDrivePoseEst_Kalman_F_Callback.vi MecaDrivePoseEst_Kalman_H_Callback.vi MecaDrivePoseEst_New.vi MecaDrivePoseEst_New.vi MecaDrivePoseEst_ResetPosition.vi MecaDrivePoseEst_SetVisionMeasurementStdDevs.vi MecaDrivePoseEst_SetVisionMeasurementStdDevs.vi MecaDrivePoseEst_SetVisionMeasurementStdDevs.vi	Sa Code Review	Test Program	Error Checking
MECANUM DRIVE POSE	ESTIMATOR		Not WPILIB	X X X X X X X X X X X X X X X X X X X	Execution Optimized	Test Routine	KalmanFilterLatencyComp_Reset.vi Function Prototype Note MecaDrivePoseEst_AddVisionMeasurement_StdDev.vi MecaDrivePoseEst_AddVisionMeasurement.vi MecaDrivePoseEst_GetEstimatedPosition.vi MecaDrivePoseEst_Kalman_F_Callback.vi MecaDrivePoseEst_Kalman_H_Callback.vi MecaDrivePoseEst_ResetPosition.vi MecaDrivePoseEst_ResetPosition.vi MecaDrivePoseEst_SetVisionMeasurementStdDevs.vi MecaDrivePoseEst_SetVisionMeasurementStdDevs.vi MecaDrivePoseEst_Update.vi MecaDrivePoseEst_Update.vi	se Code Review	Test Program	Error Checking
MECANUM DRIVE POSE	ESTIMATOR		Not WPILIB	X X X X X X X No	Execution Optimized	Test Routine	KalmanFilterLatencyComp_Reset.vi Function Prototype Note MecaDrivePoseEst_AddVisionMeasurement_StdDev.vi MecaDrivePoseEst_AddVisionMeasurement.vi MecaDrivePoseEst_GetEstimatedPosition.vi MecaDrivePoseEst_Kalman_F_Callback.vi MecaDrivePoseEst_Kalman_H_Callback.vi MecaDrivePoseEst_New.vi MecaDrivePoseEst_ResetPosition.vi MecaDrivePoseEst_SetVisionMeasurementStdDevs.vi MecaDrivePoseEst_SetVisionMeasurementStdDevs.vi MecaDrivePoseEst_SetVisionMeasurementStdDevs.vi MecaDrivePoseEst_Update.vi MecaDrivePoseEst_Update.vi MecaDrivePoseEst_Update.vi MecaDrivePoseEst_Update.vi MecaDrivePoseEst_UpdateWithTime.vi MecaDrivePoseEst_VisionCorrect_Callback.vi	Sa Code Review	Test Program	Error Checking
MECANUM DRIVE POSE	ESTIMATOR		Not WPILIB	X X X X X X X X X X X X X X X X X X X	Execution Optimized	Test Routine	KalmanFilterLatencyComp_Reset.vi Function Prototype Note MecaDrivePoseEst_AddVisionMeasurement_StdDev.vi MecaDrivePoseEst_AddVisionMeasurement.vi MecaDrivePoseEst_GetEstimatedPosition.vi MecaDrivePoseEst_Kalman_F_Callback.vi MecaDrivePoseEst_Kalman_H_Callback.vi MecaDrivePoseEst_ResetPosition.vi MecaDrivePoseEst_ResetPosition.vi MecaDrivePoseEst_SetVisionMeasurementStdDevs.vi MecaDrivePoseEst_SetVisionMeasurementStdDevs.vi MecaDrivePoseEst_Update.vi MecaDrivePoseEst_Update.vi	Sa Sa Code Review	Test Program	Error Checking
MECANUM DRIVE POSE	ESTIMATOR		Not WPILIB	X X X X X X X No	Execution Optimized	Test Routine	KalmanFilterLatencyComp_Reset.vi Function Prototype Note MecaDrivePoseEst_AddVisionMeasurement_StdDev.vi MecaDrivePoseEst_AddVisionMeasurement.vi MecaDrivePoseEst_GetEstimatedPosition.vi MecaDrivePoseEst_Kalman_F_Callback.vi MecaDrivePoseEst_Kalman_H_Callback.vi MecaDrivePoseEst_New.vi MecaDrivePoseEst_ResetPosition.vi MecaDrivePoseEst_SetVisionMeasurementStdDevs.vi MecaDrivePoseEst_SetVisionMeasurementStdDevs.vi MecaDrivePoseEst_SetVisionMeasurementStdDevs.vi MecaDrivePoseEst_Update.vi MecaDrivePoseEst_Update.vi MecaDrivePoseEst_Update.vi MecaDrivePoseEst_Update.vi MecaDrivePoseEst_UpdateWithTime.vi MecaDrivePoseEst_VisionCorrect_Callback.vi	Sa Code Review	Test Program	Error Checking
MECANUM DRIVE POSE	ESTIMATOR		Not WPILIB	X X X X X X X No	Execution Optimized	Test Routine	KalmanFilterLatencyComp_Reset.vi Function Prototype Note MecaDrivePoseEst_AddVisionMeasurement_StdDev.vi MecaDrivePoseEst_AddVisionMeasurement.vi MecaDrivePoseEst_GetEstimatedPosition.vi MecaDrivePoseEst_Kalman_F_Callback.vi MecaDrivePoseEst_Kalman_H_Callback.vi MecaDrivePoseEst_New.vi MecaDrivePoseEst_ResetPosition.vi MecaDrivePoseEst_SetVisionMeasurementStdDevs.vi MecaDrivePoseEst_SetVisionMeasurementStdDevs.vi MecaDrivePoseEst_SetVisionMeasurementStdDevs.vi MecaDrivePoseEst_Update.vi MecaDrivePoseEst_Update.vi MecaDrivePoseEst_Update.vi MecaDrivePoseEst_Update.vi MecaDrivePoseEst_UpdateWithTime.vi MecaDrivePoseEst_VisionCorrect_Callback.vi	Signal Code Review	Test Program	Error Checking
MECANUM DRIVE POSE	ESTIMATOR		Not WPILIB	X X X X X X X No	Execution Optimized	Test Routine	KalmanFilterLatencyComp_Reset.vi Function Prototype Note MecaDrivePoseEst_AddVisionMeasurement_StdDev.vi MecaDrivePoseEst_AddVisionMeasurement.vi MecaDrivePoseEst_GetEstimatedPosition.vi MecaDrivePoseEst_Kalman_F_Callback.vi MecaDrivePoseEst_Kalman_H_Callback.vi MecaDrivePoseEst_New.vi MecaDrivePoseEst_ResetPosition.vi MecaDrivePoseEst_SetVisionMeasurementStdDevs.vi MecaDrivePoseEst_SetVisionMeasurementStdDevs.vi MecaDrivePoseEst_SetVisionMeasurementStdDevs.vi MecaDrivePoseEst_Update.vi MecaDrivePoseEst_Update.vi MecaDrivePoseEst_Update.vi MecaDrivePoseEst_Update.vi MecaDrivePoseEst_UpdateWithTime.vi MecaDrivePoseEst_VisionCorrect_Callback.vi	SOURCE REVIEW	Test Program	Error Checking
MECANUM DRIVE POSE	ESTIMATOR		Not WPILIB	X X X X X X X No	ptimized Execution Optimized		KalmanFilterLatencyComp_Reset.vi Function Prototype Note MecaDrivePoseEst_AddVisionMeasurement_StdDev.vi MecaDrivePoseEst_AddVisionMeasurement.vi MecaDrivePoseEst_GetEstimatedPosition.vi MecaDrivePoseEst_Kalman_F_Callback.vi MecaDrivePoseEst_Kalman_H_Callback.vi MecaDrivePoseEst_New.vi MecaDrivePoseEst_ResetPosition.vi MecaDrivePoseEst_SetVisionMeasurementStdDevs.vi MecaDrivePoseEst_SetVisionMeasurementStdDevs.vi MecaDrivePoseEst_SetVisionMeasurementStdDevs.vi MecaDrivePoseEst_Update.vi MecaDrivePoseEst_Update.vi MecaDrivePoseEst_Update.vi MecaDrivePoseEst_Update.vi MecaDrivePoseEst_UpdateWithTime.vi MecaDrivePoseEst_VisionCorrect_Callback.vi	39 Code Review		Error
MECANUM DRIVE POSE	ESTIMATOR		Not WPILIB	X X X No No No No No No	Optimized Execution Optimized		KalmanFilterLatencyComp_Reset.vi Function Prototype Note MecaDrivePoseEst_AddVisionMeasurement_StdDev.vi MecaDrivePoseEst_AddVisionMeasurement.vi MecaDrivePoseEst_GetEstimatedPosition.vi MecaDrivePoseEst_Kalman_F_Callback.vi MecaDrivePoseEst_Kalman_H_Callback.vi MecaDrivePoseEst_ResetPosition.vi MecaDrivePoseEst_ResetPosition.vi MecaDrivePoseEst_SetVisionMeasurementStdDevs.vi MecaDrivePoseEst_SetVisionMeasurementStdDevs.vi MecaDrivePoseEst_Update.vi MecaDrivePoseEst_Update.vi MecaDrivePoseEst_VisionCorrect_Callback.vi MecaDrivePoseEst_VisionCorrect_Callback.vi	<i>y</i>		Error
MECANUM DRIVE POSE	ESTIMATOR		Not WPILIB	ttem X X X X X X X X X X X X X X X X X X X	Optimized Execution Optimized		KalmanFilterLatencyComp_Reset.vi Function Prototype Note MecaDrivePoseEst_AddVisionMeasurement_StdDev.vi MecaDrivePoseEst_AddVisionMeasurement.vi MecaDrivePoseEst_GetEstimatedPosition.vi MecaDrivePoseEst_Kalman_F_Callback.vi MecaDrivePoseEst_Kalman_H_Callback.vi MecaDrivePoseEst_ResetPosition.vi MecaDrivePoseEst_ResetPosition.vi MecaDrivePoseEst_SetVisionMeasurementStdDevs.vi MecaDrivePoseEst_SetVisionMeasurementStdDevs.vi MecaDrivePoseEst_Update.vi MecaDrivePoseEst_Update.vi MecaDrivePoseEst_VisionCorrect_Callback.vi MecaDrivePoseEst_VisionCorrect_Callback.vi	<i>y</i>		Error
MECANUM DRIVE POSE	ESTIMATOR		Not WPILIB	X X X No No No No No No	ptimized Execution Optimized	Test Routine	KalmanFilterLatencyComp_Reset.vi Function Prototype Note MecaDrivePoseEst_AddVisionMeasurement_StdDev.vi MecaDrivePoseEst_AddVisionMeasurement.vi MecaDrivePoseEst_GetEstimatedPosition.vi MecaDrivePoseEst_Kalman_F_Callback.vi MecaDrivePoseEst_Kalman_H_Callback.vi MecaDrivePoseEst_New.vi MecaDrivePoseEst_ResetPosition.vi MecaDrivePoseEst_SetVisionMeasurementStdDevs.vi MecaDrivePoseEst_SetVisionMeasurementStdDevs.vi MecaDrivePoseEst_SetVisionMeasurementStdDevs.vi MecaDrivePoseEst_Update.vi MecaDrivePoseEst_Update.vi MecaDrivePoseEst_Update.vi MecaDrivePoseEst_Update.vi MecaDrivePoseEst_UpdateWithTime.vi MecaDrivePoseEst_VisionCorrect_Callback.vi	de Review	Test Program	Error Checking

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	

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine		Function Prototype Notes	Code Review	Test Program	Error Checking
UNSCENTED KALMAN FILTER	Χ	Χ		Χ			UnscentedKalmanFilter_Correct_FuncGroup.vi				
	Χ	Χ		Χ			UnscentedKalmanFilter_Correct_OnlyUY.vi				
	Χ	Χ		Χ			UnscentedKalmanFilter_Correct_OnlyUYR.vi				
	Χ	Χ		Χ			UnscentedKalmanFilter_Correct.vi				
	Χ	Χ		Χ			UnscentedKalmanFilter_GetP_Single.vi				
	Χ	Χ		Χ			UnscentedKalmanFilter_GetP.vi				
	Χ	Χ		Χ			UnscentedKalmanFilter_GetXHat_Single.vi				
	Χ	Χ		Χ			UnscentedKalmanFilter_GetXHat.vi				
	Χ	Χ		Χ			UnscentedKalmanFilter_New_Default.vi				
	Χ	Χ		Χ			UnscentedKalmanFilter_New_FuncGroup.vi				
	Χ	Χ		X			UnscentedKalmanFilter_New.vi				
	Χ	Χ		X			UnscentedKalmanFilter_Predict.vi				
	Χ	Χ		Χ			UnscentedKalmanFilter_Reset.vi				
	Χ	Χ		Χ			UnscentedKalmanFilter_SetP.vi				
	Χ	Χ		X			UnscentedKalmanFilter_SetXHat_Single.vi				
	Χ	Χ		X			UnscentedKalmanFilter_SetXHat.vi				
	Χ	Χ		X			UnscentedKalmanFilter_Transform.vi				

'======== STATE SPACE CONTROL '=======

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
	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine			Function Prototype	Notes	Code Review	Test Program	Error Checking
DIFFERENTIAL DRIVE ACCELERATION LIMITER	Χ	Χ		X		Χ		DiffDrvAccelLimit_Calculate.vi					
	X	X		X		Χ		DiffDrvAccelLimit_New.vi					

5/24/2022 – After documentation update.					_						
					zeo						
					ii.						~
	Ø	Ø)pti	Φ			≥	E	Checking
	nte)te	99	E	0	Routine			Χie	Program	9Ck
	иe	ue.	<u>[</u>	ltem	<i>ţ</i> į	Sou			Re	õ	ક
	plementea	ıπ	3	nu	က္တ	ξ.			ge	# H	٥ <i>۲</i> (
	μ	Documentea	Not WPILIB	Menu	Execution	Test	VI Name Function Prototype	Notes	Code Revien	Test	Error
IMPLICIT MODEL FOLLOWE	RX	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		$\frac{x}{x}$	ImplModelFollow_Reset.vi				
			\rightarrow		_	\rightarrow	Implified on the Tree Critical Control of the Tree Critical Critia				
					Ø						
					ize						
					ij.						Ø
	þ	g	ω.		bd	Q			Š	Æ	Checking
	plementea	nte	Vot WPILIB	E	٤	žį.			Code Reviev	Test Program	9
	ше	пе	Ē	Item	ıţi,	301			R	20	ర్
	o)e	n	Σ Σ	מַ	Sec	st l			ge	st I	
	鱼	Documente	Š	Menu	Execution	Test Routine	VI Name Function Prototype	Notes	S	Ţe,	Error
LINEAR PLANT INVERSION FEEDFORWAR	RD X			X			LinearPIntInvFF_Calculate_NextR.vi				
	X	Χ		X		\neg	LinearPIntInvFF Calculate.vi				
	X	X	-+	X		$\overline{}$	LinearPIntInvFF_GetR_Single.vi				
	X	X		X		$\overline{}$	LinearPIntInvFF_GetR.vi				
	X	X		X		$\overline{}$	LinearPIntInvFF_GetUff_Single.vi				
	X	X	-+	X		-+	LinearPIntInvFF_GetUff.vi				
	X	X		X		-+	LinearPIntInvFF_New_Plant.vi				
	X	X	-	X		-+	LinearPIntInvFF New.vi				
	X	X	\rightarrow	X		-+	LinearPIntInvFF Reset Initial.vi				
	X	X		X		-	LinearPintInvFF Reset Zero.vi				
	^	^				\rightarrow	Linear muny 1 _reset_zero.vi				
					Ø						
					Ž.						
					<u>ii</u>						Ø
	þ	g	m		ğ	g			Š	E	kin
	inte	nte	7	Ë	2	摸			ě	gre	၁ခ
	plementea	Documente	Not WPILIB	Menu Item	Execution	Routine	VI Name Function Prototype		Code Revien	Test Program	. Checking
	ble	CC	₹	nue	90	Test			ge	St	Error
	<u>E</u>		ջ	ž	.∺	.oo.	VI Name Function Prototype	Notes	0	7e	핖
LINEAR QUADRATIC REGULATO	OR X	Χ			Щ	_		140100	O		
	X			X		\vdash	LinearQuadraticRegulator_Calculate_NextR.vi	INGICO	S		
	X	X					LinearQuadraticRegulator_Calculate_NextR.vi	Notes	O		
		X		X X		<u>-</u>	LinearQuadraticRegulator_Calculate_NextR.vi LinearQuadraticRegulator_Calculate.vi LinearQuadraticRegulator_GetK_Single.vi	NOT ORIGINAL	O		1
	X	X		X X X		X	LinearQuadraticRegulator_Calculate_NextR.vi LinearQuadraticRegulator_Calculate.vi LinearQuadraticRegulator_GetK_Single.vi LinearQuadraticRegulator_GetK.vi		O		
		X		X X X			LinearQuadraticRegulator_Calculate_NextR.vi LinearQuadraticRegulator_Calculate.vi LinearQuadraticRegulator_GetK_Single.vi LinearQuadraticRegulator_GetK.vi LinearQuadraticRegulator_GetR_Single.vi		O		
	X	X X X		X X X X			LinearQuadraticRegulator_Calculate_NextR.vi LinearQuadraticRegulator_Calculate.vi LinearQuadraticRegulator_GetK_Single.vi LinearQuadraticRegulator_GetK.vi		O		
	X	X X X		X X X X X			LinearQuadraticRegulator_Calculate_NextR.vi LinearQuadraticRegulator_Calculate.vi LinearQuadraticRegulator_GetK_Single.vi LinearQuadraticRegulator_GetK.vi LinearQuadraticRegulator_GetR_Single.vi		O		
	X X X	X X X X		X X X X X			LinearQuadraticRegulator_Calculate_NextR.vi LinearQuadraticRegulator_Calculate.vi LinearQuadraticRegulator_GetK_Single.vi LinearQuadraticRegulator_GetK.vi LinearQuadraticRegulator_GetR_Single.vi LinearQuadraticRegulator_GetR_vi LinearQuadraticRegulator_GetR_vi LinearQuadraticRegulator_GetU_Single.vi		O		
	X X X	X X X X X		X X X X X X			LinearQuadraticRegulator_Calculate_NextR.vi LinearQuadraticRegulator_Calculate.vi LinearQuadraticRegulator_GetK_Single.vi LinearQuadraticRegulator_GetK.vi LinearQuadraticRegulator_GetR_Single.vi LinearQuadraticRegulator_GetR_vi LinearQuadraticRegulator_GetU_Single.vi LinearQuadraticRegulator_GetU_Single.vi LinearQuadraticRegulator_GetU_Single.vi	NOT ORIGINAL	O		
	X X X X X	X X X X X X		X X X X X X X		X	LinearQuadraticRegulator_Calculate_NextR.vi LinearQuadraticRegulator_GetK_Single.vi LinearQuadraticRegulator_GetK_Vi LinearQuadraticRegulator_GetR_Single.vi LinearQuadraticRegulator_GetR_Single.vi LinearQuadraticRegulator_GetR_vi LinearQuadraticRegulator_GetU_Single.vi LinearQuadraticRegulator_GetU_Single.vi LinearQuadraticRegulator_LatencyCompensate.vi	NOT ORIGINAL Routine exists, but it only has	O		
	X X X X X	X X X X X X X		X X X X X X X		X	LinearQuadraticRegulator_Calculate_NextR.vi LinearQuadraticRegulator_Calculate.vi LinearQuadraticRegulator_GetK_Single.vi LinearQuadraticRegulator_GetK.vi LinearQuadraticRegulator_GetR_Single.vi LinearQuadraticRegulator_GetR_vi LinearQuadraticRegulator_GetU_Single.vi LinearQuadraticRegulator_GetU_vi LinearQuadraticRegulator_LatencyCompensate.vi LinearQuadraticRegulator_New_ELMS.vi	NOT ORIGINAL	O		
	X X X X X	X X X X X X		X X X X X X X		X	LinearQuadraticRegulator_Calculate_NextR.vi LinearQuadraticRegulator_GetK_Single.vi LinearQuadraticRegulator_GetK_Vi LinearQuadraticRegulator_GetR_Single.vi LinearQuadraticRegulator_GetR_Single.vi LinearQuadraticRegulator_GetR_Vi LinearQuadraticRegulator_GetU_Single.vi LinearQuadraticRegulator_GetU_Vi LinearQuadraticRegulator_LatencyCompensate.vi LinearQuadraticRegulator_New_ELMS.vi LinearQuadraticRegulator_New_N.vi	NOT ORIGINAL Routine exists, but it only has	O		
	X X X X X X	X X X X X X X		X X X X X X X X X		X	LinearQuadraticRegulator_Calculate_NextR.vi LinearQuadraticRegulator_GetK_Single.vi LinearQuadraticRegulator_GetK_Vi LinearQuadraticRegulator_GetR_Single.vi LinearQuadraticRegulator_GetR_Single.vi LinearQuadraticRegulator_GetR_Vi LinearQuadraticRegulator_GetU_Single.vi LinearQuadraticRegulator_GetU_Vi LinearQuadraticRegulator_LatencyCompensate.vi LinearQuadraticRegulator_New_ELMS.vi LinearQuadraticRegulator_New_N.vi LinearQuadraticRegulator_New_Raw.vi	NOT ORIGINAL Routine exists, but it only has	O		
	X X X X X X	X X X X X X X		X X X X X X X X X		X	LinearQuadraticRegulator_Calculate_NextR.vi LinearQuadraticRegulator_GetK_Single.vi LinearQuadraticRegulator_GetK_Vi LinearQuadraticRegulator_GetR_Single.vi LinearQuadraticRegulator_GetR_Single.vi LinearQuadraticRegulator_GetR_Vi LinearQuadraticRegulator_GetU_Single.vi LinearQuadraticRegulator_GetU_Vi LinearQuadraticRegulator_LatencyCompensate.vi LinearQuadraticRegulator_New_ELMS.vi LinearQuadraticRegulator_New_N.vi LinearQuadraticRegulator_New_Raw.vi	NOT ORIGINAL Routine exists, but it only has	O		
	X X X X X X X	X X X X X X X X		X X X X X X X X X		X	LinearQuadraticRegulator_Calculate_NextR.vi LinearQuadraticRegulator_Calculate.vi LinearQuadraticRegulator_GetK_Single.vi LinearQuadraticRegulator_GetK.vi LinearQuadraticRegulator_GetR_Single.vi LinearQuadraticRegulator_GetR_vi LinearQuadraticRegulator_GetU_Single.vi LinearQuadraticRegulator_GetU_vi LinearQuadraticRegulator_LatencyCompensate.vi LinearQuadraticRegulator_New_ELMS.vi LinearQuadraticRegulator_New_N.vi LinearQuadraticRegulator_New_Raw.vi LinearQuadraticRegulator_New_Raw.vi LinearQuadraticRegulator_New_SystemELMS.vi	NOT ORIGINAL Routine exists, but it only has	O		
	X X X X X X X	X X X X X X X X X		X X X X X X X X X X X X		X	LinearQuadraticRegulator_Calculate_NextR.vi LinearQuadraticRegulator_Calculate.vi LinearQuadraticRegulator_GetK_Single.vi LinearQuadraticRegulator_GetK.vi LinearQuadraticRegulator_GetR_Single.vi LinearQuadraticRegulator_GetR_vi LinearQuadraticRegulator_GetU_Single.vi LinearQuadraticRegulator_GetU_vi LinearQuadraticRegulator_LatencyCompensate.vi LinearQuadraticRegulator_New_ELMS.vi LinearQuadraticRegulator_New_N.vi LinearQuadraticRegulator_New_Raw.vi LinearQuadraticRegulator_New_Raw.vi LinearQuadraticRegulator_New_SystemELMS.vi LinearQuadraticRegulator_New_SystemELMS.vi LinearQuadraticRegulator_New_SystemELMS.vi	NOT ORIGINAL Routine exists, but it only has	O		
	X X X X X X X	X X X X X X X X X		X X X X X X X X X		X	LinearQuadraticRegulator_Calculate_NextR.vi LinearQuadraticRegulator_Calculate.vi LinearQuadraticRegulator_GetK_Single.vi LinearQuadraticRegulator_GetK.vi LinearQuadraticRegulator_GetR_Single.vi LinearQuadraticRegulator_GetR_vi LinearQuadraticRegulator_GetU_Single.vi LinearQuadraticRegulator_GetU_vi LinearQuadraticRegulator_LatencyCompensate.vi LinearQuadraticRegulator_New_ELMS.vi LinearQuadraticRegulator_New_N.vi LinearQuadraticRegulator_New_Raw.vi LinearQuadraticRegulator_New_Raw.vi LinearQuadraticRegulator_New_SystemELMS.vi	NOT ORIGINAL Routine exists, but it only has	0		
	X X X X X X X	X X X X X X X X X		X X X X X X X X X X X X		X	LinearQuadraticRegulator_Calculate_NextR.vi LinearQuadraticRegulator_Calculate.vi LinearQuadraticRegulator_GetK_Single.vi LinearQuadraticRegulator_GetK.vi LinearQuadraticRegulator_GetR_Single.vi LinearQuadraticRegulator_GetR_vi LinearQuadraticRegulator_GetU_Single.vi LinearQuadraticRegulator_GetU_vi LinearQuadraticRegulator_LatencyCompensate.vi LinearQuadraticRegulator_New_ELMS.vi LinearQuadraticRegulator_New_N.vi LinearQuadraticRegulator_New_Raw.vi LinearQuadraticRegulator_New_Raw.vi LinearQuadraticRegulator_New_SystemELMS.vi LinearQuadraticRegulator_New_SystemELMS.vi LinearQuadraticRegulator_New_SystemELMS.vi	NOT ORIGINAL Routine exists, but it only has	0		
	X X X X X X X	X X X X X X X X X		X X X X X X X X X X X X X X X X X X X		X	LinearQuadraticRegulator_Calculate_NextR.vi LinearQuadraticRegulator_Calculate.vi LinearQuadraticRegulator_GetK_Single.vi LinearQuadraticRegulator_GetK.vi LinearQuadraticRegulator_GetR_Single.vi LinearQuadraticRegulator_GetR_vi LinearQuadraticRegulator_GetU_Single.vi LinearQuadraticRegulator_GetU_vi LinearQuadraticRegulator_LatencyCompensate.vi LinearQuadraticRegulator_New_ELMS.vi LinearQuadraticRegulator_New_N.vi LinearQuadraticRegulator_New_Raw.vi LinearQuadraticRegulator_New_Raw.vi LinearQuadraticRegulator_New_SystemELMS.vi LinearQuadraticRegulator_New_SystemELMS.vi LinearQuadraticRegulator_New_SystemELMS.vi	NOT ORIGINAL Routine exists, but it only has	0		
	X X X X X X X	X X X X X X X X X		X X X X X X X X X X X X X X X X X X X		X	LinearQuadraticRegulator_Calculate_NextR.vi LinearQuadraticRegulator_Calculate.vi LinearQuadraticRegulator_GetK_Single.vi LinearQuadraticRegulator_GetK.vi LinearQuadraticRegulator_GetR_Single.vi LinearQuadraticRegulator_GetR_Vi LinearQuadraticRegulator_GetU_Single.vi LinearQuadraticRegulator_GetU_Single.vi LinearQuadraticRegulator_LatencyCompensate.vi LinearQuadraticRegulator_LatencyCompensate.vi LinearQuadraticRegulator_New_ELMS.vi LinearQuadraticRegulator_New_N.vi LinearQuadraticRegulator_New_N.vi LinearQuadraticRegulator_New_SystemELMS.vi LinearQuadraticRegulator_New_SystemELMS.vi LinearQuadraticRegulator_New_SystemELMS.vi LinearQuadraticRegulator_New.vi LinearQuadraticRegulator_Reset.vi	NOT ORIGINAL Routine exists, but it only has	0		
	X X X X X X X	X X X X X X X X X		X X X X X X X X X X X X X X X X X X X		X	LinearQuadraticRegulator_Calculate_NextR.vi LinearQuadraticRegulator_Calculate.vi LinearQuadraticRegulator_GetK_Single.vi LinearQuadraticRegulator_GetK.vi LinearQuadraticRegulator_GetR_Single.vi LinearQuadraticRegulator_GetR_Vi LinearQuadraticRegulator_GetU_Single.vi LinearQuadraticRegulator_GetU_Single.vi LinearQuadraticRegulator_LatencyCompensate.vi LinearQuadraticRegulator_LatencyCompensate.vi LinearQuadraticRegulator_New_ELMS.vi LinearQuadraticRegulator_New_N.vi LinearQuadraticRegulator_New_N.vi LinearQuadraticRegulator_New_SystemELMS.vi LinearQuadraticRegulator_New_SystemELMS.vi LinearQuadraticRegulator_New_SystemELMS.vi LinearQuadraticRegulator_New.vi LinearQuadraticRegulator_Reset.vi	NOT ORIGINAL Routine exists, but it only has			б
	X X X X X X X X	X X X X X X X X X X		X X X X X X X X X X X X X X		X	LinearQuadraticRegulator_Calculate_NextR.vi LinearQuadraticRegulator_Calculate.vi LinearQuadraticRegulator_GetK_Single.vi LinearQuadraticRegulator_GetK.vi LinearQuadraticRegulator_GetR_Single.vi LinearQuadraticRegulator_GetR_Vi LinearQuadraticRegulator_GetU_Single.vi LinearQuadraticRegulator_GetU_Single.vi LinearQuadraticRegulator_LatencyCompensate.vi LinearQuadraticRegulator_LatencyCompensate.vi LinearQuadraticRegulator_New_ELMS.vi LinearQuadraticRegulator_New_N.vi LinearQuadraticRegulator_New_N.vi LinearQuadraticRegulator_New_SystemELMS.vi LinearQuadraticRegulator_New_SystemELMS.vi LinearQuadraticRegulator_New_SystemELMS.vi LinearQuadraticRegulator_New.vi LinearQuadraticRegulator_Reset.vi	NOT ORIGINAL Routine exists, but it only has		we	king
	X X X X X X X X	X X X X X X X X X X		X X X X X X X X X X X X X X		X	LinearQuadraticRegulator_Calculate_NextR.vi LinearQuadraticRegulator_Calculate.vi LinearQuadraticRegulator_GetK_Single.vi LinearQuadraticRegulator_GetK.vi LinearQuadraticRegulator_GetR_Single.vi LinearQuadraticRegulator_GetR_Vi LinearQuadraticRegulator_GetU_Single.vi LinearQuadraticRegulator_GetU_Single.vi LinearQuadraticRegulator_LatencyCompensate.vi LinearQuadraticRegulator_LatencyCompensate.vi LinearQuadraticRegulator_New_ELMS.vi LinearQuadraticRegulator_New_N.vi LinearQuadraticRegulator_New_N.vi LinearQuadraticRegulator_New_SystemELMS.vi LinearQuadraticRegulator_New_SystemELMS.vi LinearQuadraticRegulator_New_SystemELMS.vi LinearQuadraticRegulator_New.vi LinearQuadraticRegulator_Reset.vi	NOT ORIGINAL Routine exists, but it only has		ogram	hecking
	X X X X X X X X	X X X X X X X X X X		X X X X X X X X X X X X X X		X	LinearQuadraticRegulator_Calculate_NextR.vi LinearQuadraticRegulator_Calculate.vi LinearQuadraticRegulator_GetK_Single.vi LinearQuadraticRegulator_GetK.vi LinearQuadraticRegulator_GetR_Single.vi LinearQuadraticRegulator_GetR_Vi LinearQuadraticRegulator_GetU_Single.vi LinearQuadraticRegulator_GetU_Single.vi LinearQuadraticRegulator_LatencyCompensate.vi LinearQuadraticRegulator_LatencyCompensate.vi LinearQuadraticRegulator_New_ELMS.vi LinearQuadraticRegulator_New_N.vi LinearQuadraticRegulator_New_N.vi LinearQuadraticRegulator_New_SystemELMS.vi LinearQuadraticRegulator_New_SystemELMS.vi LinearQuadraticRegulator_New_SystemELMS.vi LinearQuadraticRegulator_New.vi LinearQuadraticRegulator_Reset.vi	NOT ORIGINAL Routine exists, but it only has		Program	Checking
	X X X X X X X X	X X X X X X X X X X		X X X X X X X X X X X X X X		X	LinearQuadraticRegulator_Calculate_NextR.vi LinearQuadraticRegulator_GetK_Single.vi LinearQuadraticRegulator_GetK_Single.vi LinearQuadraticRegulator_GetR_Single.vi LinearQuadraticRegulator_GetR_Single.vi LinearQuadraticRegulator_GetR_Vi LinearQuadraticRegulator_GetU_Single.vi LinearQuadraticRegulator_GetU_Vi LinearQuadraticRegulator_LatencyCompensate.vi LinearQuadraticRegulator_New_ELMS.vi LinearQuadraticRegulator_New_N.vi LinearQuadraticRegulator_New_Raw.vi LinearQuadraticRegulator_New_Raw.vi LinearQuadraticRegulator_New_SystemELMS.vi LinearQuadraticRegulator_New.vi LinearQuadraticRegulator_Reset.vi	NOT ORIGINAL Routine exists, but it only has interger raise matrix to power.		əst Program	ror Checking
	X X X X X X X	X X X X X X X X X		X X X X X X X X X X X X X X X X X X X	otimized	X	LinearQuadraticRegulator_Calculate_NextR.vi LinearQuadraticRegulator_Calculate.vi LinearQuadraticRegulator_GetK_Single.vi LinearQuadraticRegulator_GetK.vi LinearQuadraticRegulator_GetR_Single.vi LinearQuadraticRegulator_GetR_vi LinearQuadraticRegulator_GetU_Single.vi LinearQuadraticRegulator_GetU_vi LinearQuadraticRegulator_LatencyCompensate.vi LinearQuadraticRegulator_New_ELMS.vi LinearQuadraticRegulator_New_N.vi LinearQuadraticRegulator_New_Raw.vi LinearQuadraticRegulator_New_Raw.vi LinearQuadraticRegulator_New_SystemELMS.vi LinearQuadraticRegulator_New_SystemELMS.vi LinearQuadraticRegulator_New_SystemELMS.vi	NOT ORIGINAL Routine exists, but it only has	Code Review	Test Program	Error Checking

LINEA	R S	YST	Έľ
-------	-----	-----	----

MX	X)	< 1	LinearSystem_CalculateX.vi		
X	X	7	< 1	LinearSystem_CalculateY.vi		
X	X)	K SI	LinearSystem_GetA.vi		
X	X)	K SI	LinearSystem_GetAElement.vi		
X	X		K SI	LinearSystem_GetB.vi		
X	X)	K SI	LinearSystem_GetBElement.vi		
X	X)	K SI	LinearSystem_GetC.vi		
X	X)	K SI	LinearSystem_GetCElement.vi		
X	X)	K SI	LinearSystem_GetD.vi		
X	X	(K SI	LinearSystem_GetDElement.vi		
X	X)	K SI	LinearSystem_New.vi		

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	Function Prototype	Notes	Code Review	Test Program	Error Checking
LINEAR SYSTEM LOOP				Χ			LinearSystemLoop_ClampInput.vi					
	X	Χ		Χ			LinearSystemLoop_Correct.vi					
							LinearSystemLoop_GetClampFunction.vi					
	X	Χ		Χ			LinearSystemLoop GetController.vi					
	X	Χ		Χ			LinearSystemLoop_GetError_Single.vi					
	Χ	Χ		Х			LinearSystemLoop_GetError.vi					
		Χ		Χ			LinearSystemLoop_GetFeedForward.vi					
	Χ	Χ		Х			LinearSystemLoop_GetNextR_Single.vi					
		Χ		Х			LinearSystemLoop_GetNextR.vi					
	Χ	Χ		X			LinearSystemLoop_GetObserver.vi					
	X	X		X			LinearSystemLoop_GetU_Row.vi					
	X	X		X			LinearSystemLoop_GetU.vi					
		X		Х			LinearSystemLoop GetXHat Single.vi					
	X	X		X			LinearSystemLoop_GetXHat.vi					
	,,					-	LinearSystemLoop_New_BBB					
						_	LinearSystemLoop_New_LinearSystem_ClampFunc					
	Х	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		-	LinearSystemLoop_SetNextR.vi					
	^	^		^		_	LinearSystemLoop_SetNextR.vi LinearSystemLoop_SetXHat_Single.vi					
						_	LinearSystemLoop_SetXHat.vi					
							LinearSystemLoop_SetAnat.vi					
	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program	Function Prototype	Notes	Code Review	Test Program	Error Checking
LTV DIFFERENTIAL DRIVE CONTROLLER				X	Щ		LTVDiffDriveCtrl Calculate.vi		110100			F
LIV DILI LICLATIAL DRIVE CONTROLLER	X	X		X		-	LTVDiffDriveCtrl_Calculate.vi					
	X	X		X		-	LTVDiffDriveCttl_New.vi LTVDiffDriveCttl_Calculate_TrajState.vi					
	X	X		X		_	LTVDiffDriveCtrl_Calculate_TrajState.vi LTVDiffDriveCtrl Calculate SetTolerance.vi					
	X	X		\hat{X}		-	LTVDiffDriveCtrl_Calculate_Setrolerance.vi					
	^	^		^		_	LT V D III DTI V CO LI _ O AI O LI ALI (CI CI CI CE . VI					

After documentation update.					~							
	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimizec	Test Routine	Nample Program	Function Prototype	Notes	Code Review	Test Program	Error Checking
LTV UNICYCLE CONTROLLER	X	X		Χ		Χ	LTVUnicycleCtrl_AtReference.vi	, , , , , , , , , , , , , , , , , , ,				
	Χ	Χ		Χ		Χ	LTVUnicycleCtrl_Calculate_TrajState.vi					
	X	X		Χ		Χ	LTVUnicycleCtrl_Calculate.vi					
	X	X		Χ		Χ	LTVUnicycleCtrl_New.vi					
	Χ	Χ		Χ		Χ	LTVUnicycleCtrl_SetEnabled.vi					
	Χ	Χ		Χ		Χ	LTVUnicycleCtrl_SetTolerance.vi					

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

CALLBACK HELPER		X Documented	X Not WPILIB	X Menu Item	Execution Optimized	Test Routine	Sample Program	VI Name CallbackHelp_MatrixMinus.vi	Function Prototype	Notes	Code Review	Test Program	Error Checking
	Χ	Χ	Χ	Χ				CallbackHelp_MatrixMult_CoerceSizeB.vi					
	X	Χ	Χ	Χ				CallbackHelp_MatrixMult.vi					
	Χ	Χ	Χ	Χ				CallbackHelp_MatrixPlus.vi					
DISCRETIZATION	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X	Not WPILIB	X X X X X X X X X X X X X X X X X X X	Execution Optimized	X X X X X Test Routine	Sample Program	VI Name Discretization_DiscretizeA.vi Discretization_DiscretizeAB.vi Discretization_DiscretizeABTaylor.vi Discretization_DiscretizeAQ.vi Discretization_DiscretizeAQTaylor.vi Discretization_DiscretizeAQ.vi	Function Prototype	Notes	Code Review	Test Program	Error Checking
STATE SPACE UTIL	X X Implemented	X X Documented	X Not WPILIB	X X Wenu Item	Execution Optimized	Test Routine	Sample Program	VI Name StateSpaceUtil_Check_Stabalizable.vi StateSpaceUtil_ClampInputMaxMagnitude.vi StateSpaceUtil_IsDetectable.vi StateSpaceUtil_IsStabalizable.vi	Function Prototype	Notes Internal routine Routine exists, it is just a shell	Code Review	Test Program	Error Checking
-		X				\ \							
	X	X		X		X		StateSpaceUtil_MakeCostMatrix.vi					
	X	X		X		Χ		StateSpaceUtil_MakeCovarianceMatrix.vi					
	X	X		X				StateSpaceUtil_MakeWhiteNoiseVector.vi					
-	X	X		X				StateSpaceUtil_NomalizeInputVector.vi					
	X	X		Χ				StateSpaceUtil_PoseTo3dVector.vi					
	Χ	Χ		Χ				StateSpaceUtil_PoseTo4dVector.vi					
	Χ	Χ		Χ				StateSpaceUtil_PoseToVector.vi					

Revision 2.X 5/24/2022 – After documentation update.

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

> Function Prototype Notes BATTERY SIM Χ Χ X SI BatterySim CalculateDefaultBatteryLoadedVoltage.vi XX X SI BatterySim CalculateLoadedVoltage.vi Function Prototype Notes DC MOTOR SIM X DCMotorSim_getAngularPositionRad.vi X DCMotorSim_getAngularPositionRotations.vi X X Χ DCMotorSim_getAngularVelocityRadPerSec.vi X X Χ DCMotorSim_getAngularVelocityRPM.vi Χ Χ X Χ Χ DCMotorSim GetCurrentDrawAmps.vi X X X DCMotorSim New MOI.vi X Χ Χ DCMotorSim New Plant.vi Χ X DCMotorSim SetInputVoltage.vi X Χ X Χ DCMotorSim_Update.vi Jot WPILIB Function Prototype Notes DIFFERENTIAL DRIVE TRAIN SIM X X DiffDriveTrainSim ClampInput.vi Χ Χ DiffDriveTrainSim_CreateKitbotSim_EstMass.vi XX Χ DiffDriveTrainSim CreateKitbotSim EstMassMOI.vi X X Χ DiffDriveTrainSim CreateKitbotSim.vi XX Χ DiffDriveTrainSim GetCurrentDrawAmps.vi XX Χ DiffDriveTrainSim GetCurrentGearing.vi XX DiffDriveTrainSim GetDynamics.vi Χ XX X DiffDriveTrainSim GetHeading.vi X DiffDriveTrainSim_GetLeftCurrentDrawAmps.vi X Χ Χ Χ DiffDriveTrainSim_GetLeftPositionMeters.vi Χ X X X DiffDriveTrainSim GetLeftVelocityMetersPerSecond.vi DiffDriveTrainSim_GetOutput_Single.vi X Χ X Χ Χ Χ DiffDriveTrainSim GetPose.vi X DiffDriveTrainSim GetRightCurrentDrawAmps.vi X X Χ X DiffDriveTrainSim_GetRightPositionMeters.vi X Χ Χ Χ DiffDriveTrainSim_GetRightVelocityMetersPerSecond.vi XX Χ DiffDriveTrainSim_GetState_Single.vi XX Χ DiffDriveTrainSim GetState.vi X X X DiffDriveTrainSim KitBotWheelSize.vi XX Χ DiffDriveTrainSim New Mass MOI.vi $X \mid X$ Χ DiffDriveTrainSim New.vi XX DiffDriveTrainSim_SetCurrentGearing.vi X Χ DiffDriveTrainSim_SetInputs.vi X X DiffDriveTrainSim SetPose.vi Χ Χ X Χ X DiffDriveTrainSim_SetState.vi X XX X DiffDriveTrainSim ToughBoxMiniGearRatio.vi

nentation update.						_						
	X	X		X			DiffDriveTrainSim_ToughBoxMiniMotor.vi					
	X	X		X			DiffDriveTrainSim_Update.vi					
					ō							
					Execution Optimized		_					
					₫.		Program					5
	Ø	Ø			bt	υ	gra			Š	E	Error Checking
	£ €	ţe	.99	£	5	ţį	Q_{ϵ}			ķ.	Jr.a	Š
	je.	ě	7/6	Ę.	<u>.</u> ò	no	0			Şe	Š,	ž
	Implemented	Documentea	Not WPILIB	Menu Item	cr	Test Routine	S VI Name			Code Revien	ď	Š
	ď	8	ŏ	Je J	ě	esi	S VI Name	Franchica Dactobase	Natas	8	esi	8
			_ <		Ш	<u> </u>		Function Prototype	Notes		<u> </u>	Щ
ELEVATOR SIM		X		X			ElevatorSim_GetCurrentDraw.vi					
	X			X			ElevatorSim_GetPositionMeters.vi					
	X			X			ElevatorSim_GetVelocityMetersPerSecond.vi					
	X	X		X			ElevatorSim HasHitLowerLimit.vi					
	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_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					
									-	•		
					Ø							
					Ze.							
					<u>3</u> .		W E					~
	Ø	ð			Optimized	(D)	91%			>	8	ξì
	£ €	ţe	.99	£	5	ţį	Q_{ϵ}			. <u>Q</u> .	ā	Š
											~	ų.
	je.	<u>ē</u>	6	Ę.	9.	70	0)			₹ 8	rogi	γe
	lemei	пте	WPI	ıu Ite	cutio	t Rou	ple F			e Rev	t Program	r Che
	nplemer	оспте	ot WPI	lenu Ite	xecutio	est Rou	ample A	Function Destators	Natas	ode Rev	est Progi	rror Che
51.VANUES - 0.11	Implemented	Documented	Not WPILIB	Menu Item	Execution	Test Routine	S Ample S Ample Program	Function Prototype	Notes	Code Review	Test Prog	Error Checking
FLYWHEEL SIM	ı X	X		X	Executio	Test Rou	FlyWheelSim_GetAngularVelocityRadPerSec.vi	Function Prototype	Notes	Code Rev	Test Progi	Error Che
FLYWHEEL SIM	X	X		X		Test Rou	FlyWheelSim_GetAngularVelocityRadPerSec.vi FlyWheelSim_GetAngularVelocityRPM.vi	Function Prototype	Notes	Code Rev	Test Prog	Error Che
FLYWHEEL SIM	ı X	X		X		Test Rou	FlyWheelSim_GetAngularVelocityRadPerSec.vi FlyWheelSim_GetAngularVelocityRPM.vi FlyWheelSim_GetCurrentDrawAmps	Function Prototype	Notes	Code Rev	Test Prog	Error Che
FLYWHEEL SIM	X	X		X		Test Rou	FlyWheelSim_GetAngularVelocityRadPerSec.vi FlyWheelSim_GetAngularVelocityRPM.vi FlyWheelSim_GetCurrentDrawAmps	Function Prototype		Code Rev	Test Prog	Error Che
FLYWHEEL SIM	X	X		X		Test Rou	FlyWheelSim_GetAngularVelocityRadPerSec.vi FlyWheelSim_GetAngularVelocityRPM.vi FlyWheelSim_GetCurrentDrawAmps FlyWheelSim_New_LinSys	Function Prototype	Future	Code Rev	Test Prog	Error Che
FLYWHEEL SIM	X	X		X		Test Rou	FlyWheelSim_GetAngularVelocityRadPerSec.vi FlyWheelSim_GetAngularVelocityRPM.vi FlyWheelSim_GetCurrentDrawAmps FlyWheelSim_New_LinSys FlyWheelSim_New_LinSys_MOI_NoNoise	Function Prototype	Future Future	Code Rev	Test Prog	Error Che
FLYWHEEL SIM	X X	X X X		X X X		Test Rou	FlyWheelSim_GetAngularVelocityRadPerSec.vi FlyWheelSim_GetAngularVelocityRPM.vi FlyWheelSim_GetCurrentDrawAmps FlyWheelSim_New_LinSys FlyWheelSim_New_LinSys_MOI_NoNoise FlyWheelSim_New_LinSys_NoNoise	Function Prototype	Future	Code Rev	Test Prog	Error Che
FLYWHEEL SIM	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	X X X		X X X		Test Rou	FlyWheelSim_GetAngularVelocityRadPerSec.vi FlyWheelSim_GetAngularVelocityRPM.vi FlyWheelSim_GetCurrentDrawAmps FlyWheelSim_New_LinSys FlyWheelSim_New_LinSys_MOI_NoNoise FlyWheelSim_New_LinSys_NoNoise FlyWheelSim_New_MOI.vi	Function Prototype	Future Future	Code Rev	Test Prog	Error Che
FLYWHEEL SIM	X X X	X X X		X X X		Test Rou	FlyWheelSim_GetAngularVelocityRadPerSec.vi FlyWheelSim_GetAngularVelocityRPM.vi FlyWheelSim_GetCurrentDrawAmps FlyWheelSim_New_LinSys FlyWheelSim_New_LinSys_MOI_NoNoise FlyWheelSim_New_LinSys_NoNoise FlyWheelSim_New_MOI.vi FlyWheelSim_SetInput.vi	Function Prototype	Future Future	Code Rev	Test Progi	Error Che
FLYWHEEL SIM	X X X X X X	X X X X X X		X X X X X X		Test Rou	FlyWheelSim_GetAngularVelocityRadPerSec.vi FlyWheelSim_GetAngularVelocityRPM.vi FlyWheelSim_GetCurrentDrawAmps FlyWheelSim_New_LinSys FlyWheelSim_New_LinSys_MOI_NoNoise FlyWheelSim_New_LinSys_NoNoise FlyWheelSim_New_MOI.vi FlyWheelSim_SetInput.vi FlyWheelSim_SetState.vi	Function Prototype	Future Future	Code Rev	Test Prog	Error Che
FLYWHEEL SIM	X X X	X X X X X X		X X X		Test Rou	FlyWheelSim_GetAngularVelocityRadPerSec.vi FlyWheelSim_GetAngularVelocityRPM.vi FlyWheelSim_GetCurrentDrawAmps FlyWheelSim_New_LinSys FlyWheelSim_New_LinSys_MOI_NoNoise FlyWheelSim_New_LinSys_NoNoise FlyWheelSim_New_MOI.vi FlyWheelSim_SetInput.vi	Function Prototype	Future Future	Code Rev	Test Prog	Error Che
FLYWHEEL SIM	X X X X X X	X X X X X X		X X X X X X		Test Rou	FlyWheelSim_GetAngularVelocityRadPerSec.vi FlyWheelSim_GetAngularVelocityRPM.vi FlyWheelSim_GetCurrentDrawAmps FlyWheelSim_New_LinSys FlyWheelSim_New_LinSys_MOI_NoNoise FlyWheelSim_New_LinSys_NoNoise FlyWheelSim_New_MOI.vi FlyWheelSim_SetInput.vi FlyWheelSim_SetState.vi	Function Prototype	Future Future	Code Rev	Test Prog	Error Che
FLYWHEEL SIM	X X X X X X	X X X X X X		X X X X X X		Test Rou	FlyWheelSim_GetAngularVelocityRadPerSec.vi FlyWheelSim_GetAngularVelocityRPM.vi FlyWheelSim_GetCurrentDrawAmps FlyWheelSim_New_LinSys FlyWheelSim_New_LinSys_MOI_NoNoise FlyWheelSim_New_LinSys_NoNoise FlyWheelSim_New_MOI.vi FlyWheelSim_SetInput.vi FlyWheelSim_SetState.vi	Function Prototype	Future Future	Code Rev	Test Prog	Error Che
FLYWHEEL SIM	X X X X X X	X X X X X X		X X X X X X		Test Rou	FlyWheelSim_GetAngularVelocityRadPerSec.vi FlyWheelSim_GetAngularVelocityRPM.vi FlyWheelSim_GetCurrentDrawAmps FlyWheelSim_New_LinSys FlyWheelSim_New_LinSys_MOI_NoNoise FlyWheelSim_New_LinSys_NoNoise FlyWheelSim_New_MOI.vi FlyWheelSim_SetInput.vi FlyWheelSim_SetState.vi	Function Prototype	Future Future	Code Rev	Test Prog	Error Che
FLYWHEEL SIM	X X X X	X X X X X X		X X X X X X		Test Rou	FlyWheelSim_GetAngularVelocityRadPerSec.vi FlyWheelSim_GetAngularVelocityRPM.vi FlyWheelSim_GetCurrentDrawAmps FlyWheelSim_New_LinSys FlyWheelSim_New_LinSys_MOI_NoNoise FlyWheelSim_New_LinSys_NoNoise FlyWheelSim_New_MOI.vi FlyWheelSim_SetInput.vi FlyWheelSim_SetState.vi FlyWheelSim_Update.vi	Function Prototype	Future Future	Code Rev	Test Prog	Error Che
FLYWHEEL SIM	X X X X	X X X X X X		X X X X X X		Test Rou	FlyWheelSim_GetAngularVelocityRadPerSec.vi FlyWheelSim_GetAngularVelocityRPM.vi FlyWheelSim_GetCurrentDrawAmps FlyWheelSim_New_LinSys FlyWheelSim_New_LinSys_MOI_NoNoise FlyWheelSim_New_LinSys_NoNoise FlyWheelSim_New_MOI.vi FlyWheelSim_SetInput.vi FlyWheelSim_SetState.vi FlyWheelSim_Update.vi	Function Prototype	Future Future	Code Rev	Test Prog	
FLYWHEEL SIM	X X X X X	X X X X X X		X X X X X X			FlyWheelSim_GetAngularVelocityRadPerSec.vi FlyWheelSim_GetAngularVelocityRPM.vi FlyWheelSim_GetCurrentDrawAmps FlyWheelSim_New_LinSys FlyWheelSim_New_LinSys_MOI_NoNoise FlyWheelSim_New_LinSys_NoNoise FlyWheelSim_New_MOI.vi FlyWheelSim_SetInput.vi FlyWheelSim_SetState.vi FlyWheelSim_Update.vi	Function Prototype	Future Future	.w	Test	
FLYWHEEL SIM	X X X X X	X X X X X X		X X X X X X			FlyWheelSim_GetAngularVelocityRadPerSec.vi FlyWheelSim_GetAngularVelocityRPM.vi FlyWheelSim_GetCurrentDrawAmps FlyWheelSim_New_LinSys FlyWheelSim_New_LinSys_MOI_NoNoise FlyWheelSim_New_LinSys_NoNoise FlyWheelSim_New_MOI.vi FlyWheelSim_SetInput.vi FlyWheelSim_SetState.vi FlyWheelSim_Update.vi	Function Prototype	Future Future	ew	Test	
FLYWHEEL SIM	X X X X X	X X X X X X		X X X X X X X X X X X X X X X X X X X			FlyWheelSim_GetAngularVelocityRadPerSec.vi FlyWheelSim_GetAngularVelocityRPM.vi FlyWheelSim_GetCurrentDrawAmps FlyWheelSim_New_LinSys FlyWheelSim_New_LinSys_MOI_NoNoise FlyWheelSim_New_LinSys_NoNoise FlyWheelSim_New_MOI.vi FlyWheelSim_SetInput.vi FlyWheelSim_SetState.vi FlyWheelSim_Update.vi	Function Prototype	Future Future	ew	Test	
FLYWHEEL SIM	X X X X X	X X X X X X		X X X X X X X X X X X X X X X X X X X			FlyWheelSim_GetAngularVelocityRadPerSec.vi FlyWheelSim_GetAngularVelocityRPM.vi FlyWheelSim_GetCurrentDrawAmps FlyWheelSim_New_LinSys FlyWheelSim_New_LinSys_MOI_NoNoise FlyWheelSim_New_LinSys_NoNoise FlyWheelSim_New_MOI.vi FlyWheelSim_SetInput.vi FlyWheelSim_SetState.vi FlyWheelSim_Update.vi	Function Prototype	Future Future	ew	Program	
FLYWHEEL SIM	X X X X X X	X X X X X X		X X X X X X X X X X X X X X X X X X X			FlyWheelSim_GetAngularVelocityRadPerSec.vi FlyWheelSim_GetAngularVelocityRPM.vi FlyWheelSim_GetCurrentDrawAmps FlyWheelSim_New_LinSys FlyWheelSim_New_LinSys_MOI_NoNoise FlyWheelSim_New_LinSys_NoNoise FlyWheelSim_New_MOI.vi FlyWheelSim_SetInput.vi FlyWheelSim_SetState.vi FlyWheelSim_Update.vi		Future Future Future	ew	Program	
	Implemented X X X X	X X X X X X X X X X X X X X X X X X X	Not WPILIB	Wenu Item		Test Routine Test Rou	FlyWheelSim_GetAngularVelocityRadPerSec.vi FlyWheelSim_GetAngularVelocityRPM.vi FlyWheelSim_GetCurrentDrawAmps FlyWheelSim_New_LinSys FlyWheelSim_New_LinSys_MOI_NoNoise FlyWheelSim_New_LinSys_NoNoise FlyWheelSim_New_MOI.vi FlyWheelSim_SetInput.vi FlyWheelSim_SetState.vi FlyWheelSim_Update.vi	Function Prototype Function Prototype	Future Future	Code Review Code Rev	Test	Error Checking
FLYWHEEL SIM	Implemented X X X X X	X X X X X X	Not WPILIB	X X X X X X X X X X X X X X X X X X X			FlyWheelSim_GetAngularVelocityRadPerSec.vi FlyWheelSim_GetAngularVelocityRPM.vi FlyWheelSim_GetCurrentDrawAmps FlyWheelSim_New_LinSys FlyWheelSim_New_LinSys_MOI_NoNoise FlyWheelSim_New_LinSys_NoNoise FlyWheelSim_New_MOI.vi FlyWheelSim_SetInput.vi FlyWheelSim_SetState.vi FlyWheelSim_Update.vi		Future Future Future Notes	ew	Program	
	X X X X X X X X X X X X X X X X X X X	X Documented X	Not WPILIB	X X X X X X X	Execution Optimized		FlyWheelSim_GetAngularVelocityRadPerSec.vi FlyWheelSim_GetAngularVelocityRPM.vi FlyWheelSim_GetCurrentDrawAmps FlyWheelSim_New_LinSys FlyWheelSim_New_LinSys_MOI_NoNoise FlyWheelSim_New_LinSys_NoNoise FlyWheelSim_New_MOI.vi FlyWheelSim_SetInput.vi FlyWheelSim_SetState.vi FlyWheelSim_Update.vi		Future Future Future	ew	Program	
	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X	Not WPILIB	X X X X X X X X X X X X X X X X X X X	Execution Optimized		FlyWheelSim_GetAngularVelocityRadPerSec.vi FlyWheelSim_GetAngularVelocityRPM.vi FlyWheelSim_GetCurrentDrawAmps FlyWheelSim_New_LinSys FlyWheelSim_New_LinSys_MOI_NoNoise FlyWheelSim_New_LinSys_NoNoise FlyWheelSim_New_MOI.vi FlyWheelSim_SetInput.vi FlyWheelSim_SetState.vi FlyWheelSim_Update.vi VI Name LinearSystemSim_ClampInput.vi LinearSystemSim_GetCurrentDrawAmps.vi LinearSystemSim_GetOutput_Single.vi		Future Future Future Notes	ew	Program	
	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X	Not WPILIB	X X X X X X X X X X X X X X X X X X X	Execution Optimized		FlyWheelSim_GetAngularVelocityRadPerSec.vi FlyWheelSim_GetAngularVelocityRPM.vi FlyWheelSim_GetCurrentDrawAmps FlyWheelSim_New_LinSys FlyWheelSim_New_LinSys_MOI_NoNoise FlyWheelSim_New_LinSys_NoNoise FlyWheelSim_New_MOI.vi FlyWheelSim_SetInput.vi FlyWheelSim_SetState.vi FlyWheelSim_Update.vi		Future Future Future Notes	ew	Program	
	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X	Not WPILIB	X X X X X X X X X X X X X X X X X X X	Execution Optimized		FlyWheelSim_GetAngularVelocityRadPerSec.vi FlyWheelSim_GetCurrentDrawAmps FlyWheelSim_New_LinSys FlyWheelSim_New_LinSys_MOI_NoNoise FlyWheelSim_New_LinSys_NoNoise FlyWheelSim_New_LinSys_NoNoise FlyWheelSim_New_MOI.vi FlyWheelSim_SetInput.vi FlyWheelSim_SetState.vi FlyWheelSim_Update.vi VI Name LinearSystemSim_ClampInput.vi LinearSystemSim_GetCurrentDrawAmps.vi LinearSystemSim_GetOutput_Single.vi LinearSystemSim_GetOutput.vi		Future Future Future Notes	ew	Program	
	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X	Not WPILIB	X X X X X X X X X X X X X X X X X X X	Execution Optimized		FlyWheelSim_GetAngularVelocityRadPerSec.vi FlyWheelSim_GetCurrentDrawAmps FlyWheelSim_New_LinSys FlyWheelSim_New_LinSys_MOI_NoNoise FlyWheelSim_New_LinSys_NoNoise FlyWheelSim_New_MOI.vi FlyWheelSim_SetInput.vi FlyWheelSim_SetState.vi FlyWheelSim_Update.vi FlyWheelSim_Update.vi VI Name LinearSystemSim_GetCurrentDrawAmps.vi LinearSystemSim_GetOutput_Single.vi LinearSystemSim_GetOutput.vi		Future Future Future Notes	ew	Program	
	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X	Not WPILIB	X X X X X X X X X X X X X X X X X X X	Execution Optimized		FlyWheelSim_GetAngularVelocityRadPerSec.vi FlyWheelSim_GetCurrentDrawAmps FlyWheelSim_New_LinSys FlyWheelSim_New_LinSys_MOI_NoNoise FlyWheelSim_New_LinSys_NoNoise FlyWheelSim_New_MOI.vi FlyWheelSim_SetInput.vi FlyWheelSim_SetState.vi FlyWheelSim_Update.vi VI Name LinearSystemSim_GetCurrentDrawAmps.vi LinearSystemSim_GetOutput_Single.vi LinearSystemSim_GetOutput.vi LinearSystemSim_GetOutput.vi LinearSystemSim_GetOutput.vi LinearSystemSim_GetOutput.vi LinearSystemSim_GetOutput.vi LinearSystemSim_GetOutput.vi LinearSystemSim_GetOutput.vi LinearSystemSim_GetOutput.vi LinearSystemSim_New_NoNoise.vi		Future Future Future Notes DONT IMPLEMENT	ew	Program	
	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X	Not WPILIB	X X X X X X X X X X X X X X X X X X X	Execution Optimized		FlyWheelSim_GetAngularVelocityRadPerSec.vi FlyWheelSim_GetCurrentDrawAmps FlyWheelSim_New_LinSys FlyWheelSim_New_LinSys_MOI_NoNoise FlyWheelSim_New_LinSys_NoNoise FlyWheelSim_New_MOI.vi FlyWheelSim_SetInput.vi FlyWheelSim_SetState.vi FlyWheelSim_Update.vi VI Name LinearSystemSim_GetCurrentDrawAmps.vi LinearSystemSim_GetOutput_Single.vi LinearSystemSim_GetOutput.vi LinearSystemSim_GetOutput.vi LinearSystemSim_GetOutput.vi LinearSystemSim_GetOutput.vi LinearSystemSim_GetOutput.vi LinearSystemSim_New LinearSystemSim_New LinearSystemSim_New_NoNoise.vi LinearSystemSim_New_NoNoise.vi LinearSystemSim_SetInput_Array.vi		Future Future Future Notes	ew	Program	
	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X	Not WPILIB	X X X X X X X X X X X X X X X X X X X	Execution Optimized		FlyWheelSim_GetAngularVelocityRadPerSec.vi FlyWheelSim_GetCurrentDrawAmps FlyWheelSim_New_LinSys FlyWheelSim_New_LinSys_MOI_NoNoise FlyWheelSim_New_LinSys_NoNoise FlyWheelSim_New_MOI.vi FlyWheelSim_SetInput.vi FlyWheelSim_SetState.vi FlyWheelSim_Update.vi FlyWheelSim_Update.vi VI Name LinearSystemSim_GetCurrentDrawAmps.vi LinearSystemSim_GetOutput_Single.vi LinearSystemSim_New_NoNoise.vi LinearSystemSim_New_NoNoise.vi LinearSystemSim_SetInput_Array.vi LinearSystemSim_SetInput_Single.vi LinearSystemSim_SetInput_Array.vi LinearSystemSim_SetInput_Single.vi		Future Future Future Notes DONT IMPLEMENT	ew	Program	
	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X	Not WPILIB	X X X X X X X X X X X X X X X X X X X	Execution Optimized		FlyWheelSim_GetAngularVelocityRadPerSec.vi FlyWheelSim_GetCurrentDrawAmps FlyWheelSim_New_LinSys FlyWheelSim_New_LinSys_MOI_NoNoise FlyWheelSim_New_LinSys_NoNoise FlyWheelSim_New_MOI.vi FlyWheelSim_SetInput.vi FlyWheelSim_SetState.vi FlyWheelSim_Update.vi FlyWheelSim_Update.vi VI Name LinearSystemSim_GetCurrentDrawAmps.vi LinearSystemSim_GetOutput_Single.vi LinearSystemSim_New_NoNoise.vi LinearSystemSim_New_NoNoise.vi LinearSystemSim_SetInput_Array.vi LinearSystemSim_SetInput_Vi LinearSystemSim_SetInput_JSingle.vi		Future Future Future Notes DONT IMPLEMENT	ew	Program	
	X X X X X X X X X X X X X X X X X X X	X	Not WPILIB	X X X X X X X X X X X X X X X X X X X	Execution Optimized		FlyWheelSim_GetAngularVelocityRadPerSec.vi FlyWheelSim_GetCurrentDrawAmps FlyWheelSim_New_LinSys FlyWheelSim_New_LinSys_MOI_NoNoise FlyWheelSim_New_LinSys_NoNoise FlyWheelSim_New_MOI.vi FlyWheelSim_SetInput.vi FlyWheelSim_SetState.vi FlyWheelSim_Update.vi FlyWheelSim_Update.vi VI Name LinearSystemSim_GetCurrentDrawAmps.vi LinearSystemSim_GetOutput_Single.vi LinearSystemSim_New_NoNoise.vi LinearSystemSim_New_NoNoise.vi LinearSystemSim_SetInput_Array.vi LinearSystemSim_SetInput_Vi LinearSystemSim_SetInput_JSingle.vi LinearSystemSim_SetInput_Array.vi LinearSystemSim_SetInput_Single.vi LinearSystemSim_SetInput_JSingle.vi		Future Future Future Notes DONT IMPLEMENT	ew	Program	
	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X	Not WPILIB	X X X X X X X X X X X X X X X X X X X	Execution Optimized		FlyWheelSim_GetAngularVelocityRadPerSec.vi FlyWheelSim_GetCurrentDrawAmps FlyWheelSim_New_LinSys FlyWheelSim_New_LinSys_MOI_NoNoise FlyWheelSim_New_LinSys_NoNoise FlyWheelSim_New_MOI.vi FlyWheelSim_SetInput.vi FlyWheelSim_SetState.vi FlyWheelSim_Update.vi FlyWheelSim_Update.vi VI Name LinearSystemSim_GetCurrentDrawAmps.vi LinearSystemSim_GetOutput_Single.vi LinearSystemSim_New_NoNoise.vi LinearSystemSim_New_NoNoise.vi LinearSystemSim_SetInput_Array.vi LinearSystemSim_SetInput_Vi LinearSystemSim_SetInput_JSingle.vi		Future Future Future Notes DONT IMPLEMENT	ew	Program	

X	λ		No	Li	nearSystemSim_UpdateX.vi			
X	X		No	Li	nearSystemSim_UpdateY.vi			

Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine		Notes	Code Review	Test Program	Error Checking
SINGLE JOINT ARM SIM X			X			SngJntArmSim_EsitmateMOI.vi				
X			X			SngJntArmSim_GetAngleRads.vi				
X			X			SngJntArmSim_GetCurrentDraw.vi				
X			X			SngJntArmSim_GetVelocityRadsPerSec.vi				
X			X			SngJntArmSim_HasHitLowerLimit.vi				
X			X			SngJntArmSim_HasHitUpperLimit.vi				
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		Χ			SngJntArmSim_UpdateX.vi				
X	X		X			SngJntArmSim_WouldHitLowerLimit.vi				
X	X		X			SngJntArmSim_WouldHitUpperLimit.vi				

'======== MATRIX UTILITIES '========

> Function Prototype Notes MatBuilder_Create.vi
> MatBuilder_Fill.vi MAT BUILDER X X X SI X SI XX

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimiz	Test Routine	Sample Program I	Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
MATRIX	X	Χ		Χ	SI		Mat	trix_AssignBlock.vi					
	X	X		Χ	SI			trix_Block.vi					
								trix_ChangeBoundsUnchecked.vi					
	Χ	X		Χ	SI			trix_Create.vi					
								trix_Det.vi					
	Χ	X		Χ	SI		Mat	trix_Diag.vi					
							Mat	trix_Div_Scalar.vi		labview has function			
								trix_ElementPower.vi					
	Χ	X		Χ	SI			trix_ElementSum.vi					
								trix_ElementTimes.vi					
							Mat	trix_Equals.vi					
	X	X		X	1		Mat	trix_Exp.vi					
	X	X		X	SI		Mat	trix_ExtractColumnVector.vi					
	Χ	X		Χ	SI		Mat	trix_ExtractFrom.vi					
							Mat	trix_ExtractMatrix.vi					
	X	X		X	SI			trix_ExtractRowVector.vi					
	X	X		X	SI		Mat	trix_Fill.vi					
							Mat	trix_Get.vi		labview has function			

ntation update.							ha et al. e e		MOUTE II II : EXE			
	X	Χ		Χ	1		Matrix_Ident.vi		WPILIB calls this EYE			
	X	X		X	SI		Matrix Inv.vi Matrix IsEqual.vi					
	_^	^		^	31		Matrix IsIdentical.vi					
	X	X		X	1	_	Matrix LLTDecompose.vi					
							Matrix Max.vi					
							Matrix_MaxAbs.vi					
							Matrix Mean.vi					
							Matrix MinInternal.vi					
							Matrix_Minus_Matrix.vi					
							Matrix_Minus_Scalar.vi					
	Χ	Χ		Χ	1		Matrix_NormF.vi					
							Matrix_NormIndP1.vi					
							Matrix_Plus_Matrix.vi					
				.,			Matrix_Plus_Scalar.vi		THE NEED WARDING			
	X	X		X	1		Matrix_Pow.vi		THIS NEEDS WORK!!!!			
	X	X		X	SI		Matrix_SetColumn.vi	THERE ARE LOTO OF OTHER MATRIX FUNCTIONS THAT				
	X	X		X	SI		Matrix_SetRow.vi	THERE ARE LOTS OF OTHER MATRIX FUNCTIONS THAT SHOULD BE INCLUDED HERE FOR ISOLATION.				
							Matrix_Solve.vi	SHOULD BE INCLUDED HERE FOR ISOLATION.				
							Matrix Times Matrix.vi					
					$\overline{}$		Matrix_Times_Scalar.vi					
							Matrix_Trace.vi					
	Χ	Χ		Χ	SI		Matrix_Transpose.vi					
	Χ	Χ	Χ	Χ			Matrix_WithinTolerance.vi					
SIMPLE MATRIX	X Implemented	X Documentea	Not WPILIB	X Menu Item		Test Routine	S VI Name	Function Prototype	Notes	Code Revien	Test Program	Error Checking
				^	SI		SimpleMatrix_ExtractMatrix.vi		NOTE Matrix also has an ExtractMatrix with different calling parameters YUK.			
MATRIX HELPER	X	X X Documented	X X Not WPILIB	X Menu Item	© © Execution Optimized	Test Routine	VI Name MatrixHelper_CooerceSize.vi MatrixHelper_MultCooerceBSize.vi	Function Prototype	NOTE Matrix also has an ExtractMatrix with different calling	Code Review	Test Program	Error Checking
MATRIX HELPER	X	X Documented	Χ	X Menu Item	© Execution Optimized	Test Routine	VI Name MatrixHelper_CooerceSize.vi		NOTE Matrix also has an ExtractMatrix with different calling parameters YUK.	Review	Test Program	Error Checking
MATRIX HELPER	X X X Implemented	X Documented X X X Documented	X	X X Wenu Item	9 Execution Optimized 9 9 9 Execution Optimized	Test Ro	VI Name MatrixHelper_CooerceSize.vi MatrixHelper_MultCooerceBSize.vi MatrixHelper_Zero.vi WatrixHelper_Zero.vi		NOTE Matrix also has an ExtractMatrix with different calling parameters YUK.	Review	Test Program Test Program	Error Checking
	X X X Implemented	X X Documented X X X Documented	X X X	X X Menu Item	9 9 Execution Optimized 9 9 9 Execution Optimized	Test Ro	VI Name MatrixHelper_CooerceSize.vi MatrixHelper_MultCooerceBSize.vi MatrixHelper_Zero.vi VI Name VecBuilder_1x1Fill.vi VecBuilder_2x1Fill.vi	Function Prototype	NOTE Matrix also has an ExtractMatrix with different calling parameters YUK. Notes	Review Code Review		
	X X X Implemented	X X X Documented X X X Documented	X X X	X X Menu Item X X X Menu Item	ଦ୍ର ଓ ଓ Execution Optimized ଓ ଓ ଓ Execution Optimized	Test Ro	VI Name MatrixHelper_CooerceSize.vi MatrixHelper_MultCooerceBSize.vi MatrixHelper_Zero.vi VI Name VecBuilder_1x1Fill.vi VecBuilder_2x1Fill.vi VecBuilder_3x1Fill.vi VecBuilder_3x1Fill.vi	Function Prototype	NOTE Matrix also has an ExtractMatrix with different calling parameters YUK. Notes	Review Code Review		
	X X X X X X X X X X X X X X X X X X X	X X X Documented X X X Documented	X X X	X X X Menu Item X X X Menu Item	ଦ୍ର ଓ ଓ ଓ Execution Optimized ଓ ଓ ଓ Execution Optimized	Test Ro	VI Name MatrixHelper_CooerceSize.vi MatrixHelper_MultCooerceBSize.vi MatrixHelper_Zero.vi VI Name VecBuilder_1x1Fill.vi VecBuilder_2x1Fill.vi VecBuilder_3x1Fill.vi VecBuilder_4x1Fill.vi VecBuilder_4x1Fill.vi	Function Prototype	NOTE Matrix also has an ExtractMatrix with different calling parameters YUK. Notes	Review Code Review		
	X X X X X X X X X X X X X X X X X X X	X X X Documented X X X Documented	X X X	X X X Menu Item X X X Menu Item	ଦ୍ର ଓ ଓ ଓ ଅଧିକ Execution Optimized	Test Ro	VI Name MatrixHelper_CooerceSize.vi MatrixHelper_MultCooerceBSize.vi MatrixHelper_Zero.vi WatrixHelper_Zero.vi VecBuilder_1x1Fill.vi VecBuilder_3x1Fill.vi VecBuilder_4x1Fill.vi VecBuilder_5x1Fill.vi VecBuilder_5x1Fill.vi VecBuilder_5x1Fill.vi	Function Prototype	NOTE Matrix also has an ExtractMatrix with different calling parameters YUK. Notes	Review Code Review		
	X X X X X X X X X X X X X X X X X X X	X X X Documented X X X Documented	X X X	X X X Menu Item X X X Menu Item	ଦ୍ର ଓ ଓ ଓ Execution Optimized ଓ ଓ ଓ Execution Optimized	Test Ro	VI Name MatrixHelper_CooerceSize.vi MatrixHelper_MultCooerceBSize.vi MatrixHelper_Zero.vi VI Name VecBuilder_1x1Fill.vi VecBuilder_2x1Fill.vi VecBuilder_3x1Fill.vi VecBuilder_4x1Fill.vi VecBuilder_4x1Fill.vi	Function Prototype	NOTE Matrix also has an ExtractMatrix with different calling parameters YUK. Notes	Review Code Review		

X	X	X	SI		VecBuilder_8x1Fill.vi		1
					VecBuilder_9x1Fill.vi		I
					VecBuilder_10x1Fill.vi		I
X	Χ	XX	SI		VecBuilder_ArrayBy1Fill.vi		
							Ī

'======== MATH '========

ANGLE STATISTICS X X X X X X X X X X X X X X X X X X X	AngleStats_AngleAdd_CallbackHelp.vi	Function Prototype	Notes	Code Review	Test Program	Error Checking
X X X I X	X AngleStats_AngleMean.vi					
	AngleStats_AngleResidual_CallbackHelp.vi X AngleStats_AngleResidual.vi					
MATH ITILITY WPILIB Secution Optimized A	MathUtil_AngleModulus.vi MathUtil_ApplyDeadband.vi	Function Prototype	Notes	Code Review	Test Program	Error Checking
X X X SI	MathUtil_Clamp_Int.vi MathUtil_Clamp.vi					
X X X SI	MathUtil_InputModulus.vi MathUtil_Interpolate.vi					
Implemented Not WPILIB Execution Optimized Test Bouring	S E VI Name	Function Prototype	Notes	Code Review	Test Program	Error Checking
MERWE SCALED SIGMA POINTS X X X X I X SI	MerweScSigPts_ComputeWeights.vi MerweScSigPts_GetNumSigmas.vi					
X X X SI X X X X X X X X X	MerweScSigPts_GetWc_Single.vi MerweScSigPts_GetWc.vi					
X X	MerweScSigPts_GetWm_Single.vi					
X X X SI	MerweScSigPts_GetWm.vi					
	MerweScSigPts_New_Default.vi MerweScSigPts_New.vi					
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	MerweScSigPts_SigmaPoints.vi					
Implemented Documented Not WPILIB Menu Item Execution Optimized	Sample Program Sample Program	Function Prototype	Notes	Code Review	Test Program	Error Checking

After documentation update.		_	_							
NUMERICAL INTEGRATION	$X \mid X$		X	/	NumIntegrate_Func_Ax_Bu_K.vi		NOT USED. Should this be used			
	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		- V		N. I. C. BIA BILLY II :		or abandoned???			
	XX		X		NumIntegrate_Rk4_Dbl_X_U.vi			-		
	X X		X		NumIntegrate_Rk4_Dbl_X.vi					
	X X		X		NumIntegrate_Rk4_Mat_X_U.vi					
	XX		X		NumIntegrate_Rk4_Mat_X.vi					
	X X		No							
	XX		No							
	XX		No	SI	NumIntegrate_Rkdp_Func_B1B2.vi					
	XX		No							
	XX		No		Numintegrate_Rkdp_Impl.vi					
	X X		X		NumIntegrate_RKDP_Mat_X_U.vi		New replacement for RKF45			
	X X		No	SI			New replacement for title 45			
	$\begin{array}{c c} X & X \\ \hline X & X \end{array}$		No	SI	NumIntegrate_Rkf45_Func_B1.vi			+		
					Number and Diff. Tune D100 vi					
	X X		No							
	X X	_	No	SI						
					NumIntegrate_RKf45_Func_Bs.vi		Removed. Replaced with newer			
						<u> </u>	functions.			
					NumIntegrate_RKf45_Func_Ch.vi		Removed. Replaced with newer			
						<u> </u>	functions.			
					NumIntegrate_RKf45_Func_Ct.vi		Removed. Replaced with newer			
		_					functions.			
	X X		No	1	NumIntegrate_Rkf45_Impl.vi					
	X X		X		NumIntegrate_Rkf45_Mat_X_U.vi	ļ l	Note that this Feinberg method has			
						ļ!	been changed and a Dormand			
							Price method has been			
					New July 2015 Nove i		implemented TODO			
					NumIntegrate_RKf45_New.vi		Removed. Never used.			
		X	X	SI						
	X X	X	X	1	NumIntegrate_Trap_Mat.vi					
	Implemented Documented	Not WPILIB	Menu Item	Execution	Sample Program aweN IA Sample Program	Figure 1 to 1 Poststein 1	Notes	Code Revie	est Prog	Error Checking
	_	_ <		Ü		Function Prototype I	Notes	U		Ш
RUNGE KUTTA TIME VARYING	X X		No		RungeKuttaTimeVarying_RK4_Mat_T_Y.vi					
	Implemented Documented	Not WPILIB	Menu Item	Execution Optimized	Sample Program ame In Sample Program			Code Review	est Program	Error Checking
		_ <u> </u>	ຸ ≥	ΨÛ		Function Prototype I	Notes	ŭ	<u> </u>	<u> </u>
	X X		X		NumJacobian_U.vi					
	X X		X		NumJacobian_X.vi					
	Implemented Documented	Not WPILIB	Menu Item	Execution Optimized	Sample Program Namble Program	Employ Buttern		Code Review	est Program	Error Checking
		ŢŽ	Ž	ш			Notes	Ŭ	<u> </u>	<u> </u>
RICCATI			X		Riccati_Check_Detectable.vi		Routine exists, it is just a shell			
	XX		X		Riccati_Check_Stabilizable.vi		Not really done !!!			
					Riccati_DARE_Choose.vi		Intended to allow DARE method			
							testing.			
						<u> </u>	icsting.			
	X X	X	X		X Riccati_DARE_Iterate.vi		lesung.			
	X X X X	X	X				county.			
	XX	X	X		X Riccati_DARE_StructDoubling.vi		leasung.			
	X X X X X X X X	X	X X X				esting.			

X X Riccati_Input_Check.vi		

'========

VISION '========

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimized	Test Routine	Sample Program
COMPUTER VISION UTILITIES	X	X		X			
	X	X		X			

	Implemented	Documented	Not WPILIB	Menu Item	Execution Optimize	Test Routine	Sample Program	Function Prototype	Notes	Code Review	Test Program	Error Checking
ES	Χ	Χ		Χ			CompVisionUtil_CalculateDistanceToTarget.vi					
	Χ	Χ		Χ			CompVisionUtil_EstimateCameraToTarget.vi					
	Χ	Χ		Χ			CompVisionUtil_EstimateFieldToCamera.vi					
	Χ	Χ		Χ			CompVisionUtil_EstimateFieldToRobot.vi					
	Χ	Χ		Χ			CompVisionUtil_EstimateFieldToRobot_Alt.vi					

'======== TYPE DEFINITIONS '========

Type

	Impler	Docun	Not W	Menu	Execu	Test R	Sampl	VI Name	Function Prototype	Notes
peDef	Ζ	Ζ	Χ	Χ	N/A			ARM_FF.CTL		
	Ζ	Ζ	Χ	Χ	N/A			BANG BANG.CTL		
	1		X	X	N/A			BICon-Matrix_FUNC_TYPE.CTL		NOT USED. Should this be deleted or abandoned???
	Ζ	Ζ	Χ	X	N/A			CALLBACK_FUNC_TYPE.CTL		
	Ζ	Ζ	Χ	Χ	N/A			CHASSIS_SPEEDS.CTL		
	Ζ	Ζ	Χ	Χ	N/A			CONTRAINED_STATE.CTL		
	Ζ	Ζ	Χ	Χ	N/A			COORDINATE_AXIS.CTL		
	Ζ	Ζ	Χ	Χ	N/A			COORDINATE_SYSTEM.CTL		
	Ζ	Ζ	Χ	Χ	N/A			DCMOTOR_TYPES_ENUM.CTL		
	Ζ	Ζ	Χ	Χ	N/A			DCMOTOR.CTL		
	Ζ	Ζ	Χ	Χ	N/A			DCMOTOR_SIM.CTL		
	Ζ	Ζ	Χ	Χ	N/A			DEBOUNCER_TYPE_ENUM.Ctl		
	Ζ	Ζ	Χ	Χ	N/A			DEBOUNCER.CTL		
	Ζ	Ζ	Χ	Χ	N/A			DIFF_DRIVE_ACCEL_LIMIT.CTL		
	Ζ	Ζ	Χ	Χ	N/A			DIFF_DRIVE_KINEMATICS.CTL		
	Ζ	Ζ	Χ	Χ	N/A			DIFF_DRIVE_Kitbot_WheelSize_ENUM.ctl		
	Ζ	Ζ	Χ	Χ	N/A			DiFF_DRIVE_Pose_EST.ctl		
	Ζ	Ζ	Χ	Χ	N/A			DIFF_DRIVE_ToughBoxMini_GearChoice_ENUM.ctl		
	Ζ	Ζ	Χ	Χ	N/A			DIFF_DRIVE_ToughBoxMini_MotorChoice_ENUM.ctl		
	Ζ	Ζ	Χ	Χ	N/A			DIFF_DRIVE_TRAIN_SIM_STATE_ENUM.CTL		
	Ζ	Ζ	Χ	Χ	N/A			DIFF_DRIVE_TRAIN_SIM.ctl		
	Ζ	Ζ	Χ	Χ	NA			DISPLAY_WAYPOINT.ctl		Was UTIL_WAYPOINT.VI
	Ζ	Ζ	X	X	NA			DISPLAY_WEIGHTED_WAYPOINT.ctl		New V1.5. was UTIL_WEIGHTED_WAYPOINIT.VI
	Ζ	Ζ	Χ	Χ	N/A			ELEV_FF.CTL		
	Ζ	Ζ	Χ	Χ	N/A			ELEVATOR_SIM.CTL		
	Ζ	Ζ	Χ	Χ	N/A			EXTENDED_KALMAN_CORRECT_FUNC_GROUP.CTL		
	Ζ		Χ	Χ	N/A			EXTENDED_KALMAN_FILTER.CTL		
	Ζ	Ζ	Χ	X	N/A			FLYWHEEL_SIM.ctl		
	Ζ	Ζ	Χ	X	N/A			FUNCTION_GENERATOR.ctl		
	Ζ	Ζ	Χ	Χ	N/A			FUNCTION_GENERATOR_MATRIX.ctl		
	Ζ	Ζ	Χ	Χ	N/A			HOLONOMIC_DRV_CTRL.CTL		New 1/26/21
	Ζ	Ζ	Χ	Χ	N/A			TIME_INTERPOLATABLE_BOOLEAN.CTL		
	Ζ	Ζ	Χ	Χ	N/A			TIME_INTERPOLATABLE_DOUBLE.CTL		

Z	Ζ	X	X	N/A	TIME INTERPOLATABLE POSE2D.CTL	
Z	Ζ	Χ	Χ		TIME_INTERPOLATABLE_ROTATION2D.CTL	
Z	Ζ	X	Χ		KALMAN_FILTER_LATENCY_COMP_FUNC_GROUP.CTL	
Z	Z	X	Χ	N/A	KALMAN_FILTER_LATENCY_COMP.CTL	
Ζ	Ζ	X	Χ	N/A	KALMAN FILTER.cti	
Z	Ζ	X	Χ		LINEAR FILTER.CTL	
Z	Z	X	X		LINEAR PLANT INV FF.ctl	
Z	Ζ	Χ		N/A	LINEAR_QUADRATIC_REGULATOR.ctl	
Z	Z	X	Χ	N/A	LINEAR_SYSTEM_LOOP.ctl	
Z	Z	X	X	N/A	LINEAR SYSTEM SIM.ctl	
Z	Ζ	X		N/A	LINEAR SYSTEM.cti	
Z	Z	X	X		LTV DIFF DRIVE CTRL.ctl	
Z	Z	Χ	Χ		LTV_DIFF_DRIVE_CTRL_STATE_ENUM.ctl	
Z	Ζ	X		N/A	LTV_UNICYCLE_CONTROLLER.CTL	
Z	Z	X	Χ	N/A	LTV_UNICYCLE_CONTROLLER_INPUT_ENUM.ctl	
Z	Z	X	Χ	N/A	LTV UNICYCLE CONTROLLER STATE ENUM.ctl	
Z	Ζ	Χ	X		MECA DRIVE KINEMATICS.CTL	
Z	Z	X		N/A	MECA DRIVE ODOMETRY.CTL	
Z	Z	X	X		MECA_DRIVE_POSE_EST.CTL	
Z	Ζ	Χ	Χ	N/A	MECA_WHEEL_SPEEDS.CTL	
Z	Ζ	Χ		N/A	MEDIAN_FILTER.CTL	
Z	Ζ	X	X	N/A	MERWE SCALED SIGMA PTS.ctl	
Z	Z	X		N/A	OBSERVER SNAP LIST ITEM.CTL	
Z	Z	X		N/A	OBSERVER SNAPSHOT.CTL	
Z	Z	X		N/A	PARAM_STACK_ITEM.CTL	
Z	Ζ	X	Χ		PARAM_STACK.CTL	
Z	Z	X	Χ	N/A	PID_ADV_LIMITS.CTL	
Z	Ζ	X	X	N/A	PID ADV TUNING.CTL	
Z	Z	X	X		PID CONTROLLER.CTL	
	Z	X	X	N/A	PID ERROR TOLERANCE.CTL	
Z						
Z	Ζ	Χ	Χ		PID_INPUT_LIMITS.CTL	
Z	Z	X	Χ	N/A	PID_TUNING.CTL PID_TUNING.CTL	
Z	Z	X	Χ	N/A	POSE2D.CTL	
Z	Ζ	X	Χ	N/A	POSE3D.CTL	
Z	Z	X	X		POSEWCURVATURE.CTL	
Z	Z	X	X	N/A	PROFILED_PID_CONTROLLER.CTL	
Z	Ζ	Χ		N/A	QUATERNION.CTL QUATERNION.CTL	
Z	Ζ	Χ	Χ		RAMSETE_EXE_TUNING.CTL	
Z	Z	X	X		RAMSETE.CTL	
Z	Z	X	X	N/A	ROTATION2D.CTL	
Z	Ζ	Χ	X		ROTATION3D.CTL	
Z	Z	X		N/A	SIMPLE MOTOR FF.CTL	
Z	Z	\hat{x}		N/A	SINGLE JOINT ARM SIM.CTL	
Z	Ζ	Χ	Χ		SLEW_RATE_LIMITER.CTL	
Z	Ζ	X	Χ		SPLINE_CTRL_VECTOR.CTL SPLINE	
Z	Ζ	X	Χ	N/A	SPLINE.CTL SPLINE.CTL	
Z	Ζ	Χ		N/A	SWERVE DRIVE KINEMATICS.CTL	
Z	Z	X	X		SWERVE DRIVE MODULE STATE.CTL	
Z	Z	X	\hat{X}		SWERVE DRIVE ODOMETRY.CTL	
Z	Z	X		N/A	SWERVE_DRIVE_Pose_EST.CTL	
Z	Ζ	Χ		N/A	TIMER.CTL	
Z	Ζ	X	Χ	N/A	TRAJ_CONFIG.CTL	
Z	Ζ	X		N/A	TRAJ CONSTRAINT CENTRIPETAL ACCEL.CTL	
Z	Z	X	X		TRAJ CONSTRAINT DIIF DRIVE KINEMATICS.CTL	
Z	Z	X	X		TRAJ CONSTRAINT DIIF DRIVE VOLTAGE.CTL	
	Z	X	\hat{x}		TRAJ_CONSTRAINT_ELLIP_REGION.CTL	
Z			٨			Davidina aviata it is installed
I		X		N/A	TRAJ_CONSTRAINT_JERK.CTL	Routine exists, it is just a shell
Z	Ζ	Χ	Χ		TRAJ_CONSTRAINT_MAX_VELOCITY.CTL	
	Ζ	X	Χ		TRAJ_CONSTRAINT_MECA_DRIVE_KINEMATICS.CTL	
Ζ		X	Χ	N/A	TRAJ CONSTRAINT MINMAX.CTL	
	Z				TRAJ CONSTRAINT RECT REGION.CTL	
Z			X			
Z Z Z	Ζ	Χ	X		TRAI CONSTRAINT SWERVE DRIVE KINEMATICS CTI	
Z	Z Z	X	Χ	N/A	TRAJ_CONSTRAINT_SWERVE_DRIVE_KINEMATICS.CTL	
Z Z Z Z Z	Z Z Z	X X X	X X	N/A N/A	TRAJ_STATE.CTL	
Z	Z Z Z	X X X X	X X X	N/A N/A N/A	TRAJ_STATE.CTL TRAJECTORY_SPLINE_TYPE_ENUM.CTL	
Z Z Z Z Z Z	Z Z Z Z Z	X X X X	X X X	N/A N/A N/A N/A	TRAJ_STATE.CTL TRAJECTORY_SPLINE_TYPE_ENUM.CTL TRAJECTORY.CTL	
Z Z Z Z Z	Z Z Z	X X X X	X X X	N/A N/A N/A N/A	TRAJ_STATE.CTL TRAJECTORY_SPLINE_TYPE_ENUM.CTL	
Z Z Z Z Z Z Z	Z Z Z Z Z	X X X X	X X X X	N/A N/A N/A N/A	TRAJ_STATE.CTL TRAJECTORY_SPLINE_TYPE_ENUM.CTL TRAJECTORY.CTL	

FRC_LabVIEW_Trajectory_Library_Routines.xlsx Page 37 / 38

Z	Z	X	X	N/A	TRANSLATION2D.CTL	
Z	Ζ	X	Χ	N/A	TRANSLATION3D.CTL	
Z	Ζ	X	X	N/A	TRAPEZOID_PROFILE_CONSTRAINT.CTL	
Z	Ζ	Χ	X	N/A	TRAPEZOID_PROFILE_STATE.CTL	
Z	Ζ	X	X	N/A	TRAPEZOID_PROFILE.CTL	
Z	Ζ	X	X	N/A	TWIST2D.CTL	
Z	Ζ	X	X	N/A	TWIST3D.CTL	
Z	Ζ	X	X	N/A	UNSCENTED_KALMAN_CORRECT_FUNC_GROUP.CTL	
Z	Ζ	X	X	N/A	UNSCENTED_KALMAN_FILTER.ctl	
Z	Ζ	X	X	N/A	UNSCENTED_KALMAN_NEW_FUNC_GROUP.CTL	
Z	Ζ	X	X	N/A	UTIL_PATHFINDER_CONFIG.CTL	
N/A		N/A		N/A	WAYPOINTS.CTL	Delete – obsolete
Z	Ζ	Χ	X	NA	WEIGHTED_WAYPOINT.CTL	New V1.5
N/A		N/A		N/A	X_Y_HEADINGS.CTL	Delete – obsolete
Z	Ζ	X	X	N/A	X_Y_PAIR.CTL	

FRC_LabVIEW_Trajectory_Library_Routines.xlsx Page 38 / 38