GMAT Commands Reference Table (DRAFT for R2013a)

Command	Option	Description/Comments	Default Value	Range	Required
Achieve	Arg1	The Arg1 option is the desired value for the goal after the solver has converged.	42165	Real Number, Array element, or Variable	yes
Achieve	Arg2	Arg2 is the convergence tolerance for how close Goal equals Arg1	0.1	Real Number, Array element, Variable, or any user-defined parameter > 0	no
Achieve	Goal	The option allows the user to select any single element user defined parameter, except a number, as a targeter goal.	DefaultSC.Earth.RMAG	Spacecraft parameter, Array element, Variable, or any other single element user defined parameter, excluding numbers	yes
Achieve	SolverName	The SolverName option allows the user to choose which targeter uses the goal specified in the Achieve command	DefaultDC	Any user defined targeter	yes
BeginFiniteBurn	Burn	The Burn field defines the FiniteBurn object activated by the BeginFiniteBurn command.	DefaultFB	FiniteBurn Object	yes
BeginFiniteBurn	SpacecraftList	The Spacecraft list field defines the spacecraft acted upon by the BeginFiniteBurn command. Spacecraft listed in SpacecraftList will have thrusters activated according to the configuration of the FiniteBurn object defined by the Burn field.	DefaultSC	Spacecraft Objects	yes
CallMatlabFunction	FunctionName	Name of the MATLAB function name to be called	None	NA	yes
CallMatlabFunction	InputArguments	Input arguments to MATLAB function call	None	NA	no
CallMatlabFunction	OutputArguments	Output arguments returned from the MATLAB function call	None	NA	no

Command	Option	Description/Comments	Default Value	Range	Required
ClearPlot	OutputNames	The ClearPlot command allows the user to clear data from a XYPlot subscriber. When more than one subscriber is being used, they need to be separated by a space.	None	Any number of XYPlot objects	yes
EndFiniteBurn	Burn	The Burn field defines the FiniteBurn object de-activated by the EndFiniteBurn command.	DefaultFB	FiniteBurn Object	yes
EndFiniteBurn	SpacecraftList	The Spacecraft list field defines the spacecraft acted upon by the EndFiniteBurn command. Spacecraft listed in SpacecraftList will have thrusters de-activated according to the configuration of the FiniteBurn object defined by the Burn field.	DefaultSC	Spacecraft Objects	yes
EndOptimize	N/A	An EndOptimize command is required to close the Optimize command.			yes
EndTarget	N/A	An EndTarget command is required to close the Target command.			yes
For	End	The End parameter is the upper (or lower if Increment is negative) bound for the Index parameter	10	-Inf < End < Inf	yes
For	Increment	The Increment parameter is used to compute the arithmetic progression of the loop Index such that the Ith pass through the loop is Start + I*Increment if the resulting value satisfies the constraint defined by End.	1	-Inf < Increment < Inf	no
For	Index	Index is the independent variable in a for loop and it is computed according to the arithmetic progression defined by the values for Start, Increment, and End.	Variable Named "I"	-Inf < Index < Inf	yes
For	Start	The Start parameter is the initial value for the Index parameter	1	-Inf < Start < Inf	yes

Command	Option	Description/Comments	Default Value	Range	Required
Maneuver	ImpulsiveBurnName	The ImpulsiveBurnName field allows the user to select any previously created impulsive burn. As an example, to maneuver DefaultSC using DefaultIB, the script line would appear as Maneuver DefaultIB(DefaultSC).	DefaultIB	Any impulsive burn existing in the resource tree or created in the script	yes
Maneuver	SpacecraftName	The SpacecraftName field allows the user to select which spacecraft to maneuver using the maneuver selected in the ImpulsiveBurnName field.	DefaultSC	Any spacecraft existing in the resource tree or created in the script	yes
MarkPoint	OutputNames	The MarkPoint command allows the user to add a special mark point character to highlight an individual data point on an XYPlot.	None	Any number of XYPlot objects	yes
Minimize	ObjectiveFunction	The ObjectiveFunction field allows the user to specify the objective function that the optimizer will try to minimize.	DefaultSC.Earth.RMAG	Spacecraft parameter, Array element, Variable, or any other single element user defined parameter, excluding numbers	yes
Minimize	OptimizerName	The OptimizerName option allows the user to specify which solver to minimize the cost functionallows the user to specify which solver to use to minimize the cost function	DefaultSQP	Any vf13ad or fmincon optimizer object.	yes
NonlinearConstraint	LHS	The SolverName option allows the user to select any single element user defined parameter, except a number, to define the constraint variable. The constraint function is of the form 'LHS Operator RHS'	DefaultSC.SMA	Spacecraft parameter, Array element, Variable, or any other single element user defined parameter, excluding numbers	yes
NonlinearConstraint	Operator	logical operator used to specify the constraint function. The constraint function is of the form 'LHS Operator RHS'	=	>=, <=, =	yes

Command	Option	Description/Comments	Default Value	Range	Required
NonlinearConstraint	OptimizerName	The SolverName field specifies the solver/optimizer object used to apply a constraint.	DefaultSQP	Any vf13ad or fmincon optmizer object.	yes
NonlinearConstraint	RHS	The RHS option allows the user to select any single element user defined parameter, including a number, to specify the desired value of the constraint variable. The constraint function is of the form 'LHS Operator RHS'	7000	Spacecraft parameter, Array element, Variable, or any other single element user defined parameter, including numbers	yes
Optimize	ApplyCorrections	The ApplyCorrections button replaces the initial guess values specified in the Vary commands with those computed by the optimizer during a run. If the Optimize sequence converged, the converged values are applied. If the Optimize sequence did not converge, the last calculated values are applied. There is one situation where the action specified above, where the initial guess values specified in the Vary commands are replaced, does not occur. This happens when the initial guess value specified in the Vary command is given by a variable.	N/A	N/A	no

Command	Option	Description/Comments	Default Value	Range	Required
Optimize	ExitMode	The ExitMode parameter allows you to control the initial guess values for Optimization sequences nested in control flow. If ExitMode is set to SaveAndContinue, the solution of an Optimization sequence is saved and used as the initial guess for the next time this optimization sequence is run. The rest of the mission sequence is then executed. If ExitMode is set to DiscardAndContinue, then the solution is discarded and the initial guess values specified in the Vary commands are used for each Optimization sequence execution. The rest of the mission sequence is then executed. If ExitMode is set to Stop, the Optimization sequence is executed, the solution is discarded, and the rest of the mission sequence is not executed.	DiscardAndContinue	DiscardAndContinue, SaveAndContinue, Stop	no
Optimize	SolveMode	The SolveMode parameter allows you to specify how the Optimization loop behaves during mission execution. When SolveMode is set to Solve, the optimization loop executes and attempts to solve the optimization problem. When SolveMode is set to RunInitialGuess, the Optimizer does not attempt to solve the optimization problem and the commands in the Optimization sequence execute using the initial guess values defined in the Vary commands.	Solve	Solve, RunInitialGuess	no
Optimize	SolverName	The SolverName field specifies the solver/optimizer object used in the optimization sequence	DefaultSQP	Any vf13ad or fmincon optmizer object.	yes

Command	Option	Description/Comments	Default Value	Range	Required
PenDown	OutputNames	When a PenDown command is issued for a plot, data is drawn for each integration step until a PenUp command is issued for that plot.	DefaultGroundTrackPlot	Any XYPlot, OrbitView or GroundTrackPlot	yes
PenUp	OutputNames	When a PenUp command is issued for a plot, no data is drawn to that plot until a PenDown command is issued for that plot	DefaultGroundTrackPlot	Any XYPlot, OrbitView or GroundTrackPlot	yes
Propagate	AMatrix	Optional flag to compute the state Jacobian or "A" matrix. The state Jacobian is only computed for numerical integrator type propagators.	Not Used	"AMatrix'	no
Propagate	BackProp	Optional flag to propagate all spacecraft in a Propagate command backwards in time.	Not Used	BackProp	no
Propagate	PropagatorName	A propagator name.	DefaultProp	Valid propagator name.	yes
Propagate	SatList	A comma separated list of spacecraft. For SPK type propagators, the spacecraft must be configured with valid SPK kernels.	DefaultSC	Valid list of spacecraft and/or formations.	yes
Propagate	STM	Optional flag to propagate orbit STM. STM propagation only occurs for numerical integrator type propagators.	Not Used	"STM'	no
Propagate	StopList	A comma separated list of stopping conditions. Stopping conditions must be paramateres of propagates spacecraft in SatList. See Remarks for more details.	ElapsedSecs = 12000	Valid list of stopping conditions.	no
Propagate	StopTolerance	Tolerance on the stopping condition root location. See Remarks for more details.	0.0000001	Real number > 0	no
Propagate	Synchronized	Optional flag to time-synchronize propagation of spacecraft performed by multiple propagators in a single propagate command. See Remarks for more details.	Not Used	Synchronized	no

Command	Option	Description/Comments	Default Value	Range	Required
Report	DataList	The DataList option allows the user to output data to the Filename specified by the ReportName. Multiple objects can be in the DataList when they are separated by spaces.	DefaultSC.A1ModJulian	Spacecraft or Impulsive Burn reportable Parameter, Array, Array Element, Variable, or String.	yes
Report	ReportName	The ReportName option allows the user to specify the ReportFile for data output.	DefaultReportFile	Any ReportFile created	yes
Target	ApplyCorrections	The ApplyCorrections button replaces the initial guess values specified in the Vary commands. If the Target sequence converged, the converged values are applied. If the Target sequence did not converge, the last calculated values are applied. There is one situation where the action specified above, where the initial guess values specified in the Vary commands are replaced, does not occur. This happens when the initial guess value specified in the Vary command is given by a variable. See the Remarks section of the help for additional details.	N/A	N/A	no

Command	Option	Description/Comments	Default Value	Range	Required
Target	ExitMode	The ExitMode parameter allows you to control the initial guess values for Target sequences nested in control flow. If ExitMode is set to SaveAndContinue, the solution of a Target sequence is saved and used as the initial guess for the next Target Sequence execution. The rest of the mission sequence is then executed. If ExitMode is set to DiscardAndContinue, then the solution is discarded and the initial guess values specified in the Vary commands are used for each target sequence execution. The rest of the mission sequence is then executed. If ExitMode is set to Stop, the Target sequence is executed, the solution is discarded, and the rest of the mission sequence is not executed.	DiscardAndContinue	DiscardAndContinue, SaveAndContinue, Stop	no
Target	SolveMode	The SolveMode parameter allows you to specify how the Target loop behaves during mission execution. When SolveMode is set to Solve, the target loop executes and attempts to solve the boundary value problem satisfying the targeter constraints (i.e, goals). When SolveMode is set to RunInitialGuess, the Targeter does not attempt to solve the boundary value problem and the commands in the Target sequence execute using the initial guess values defined in the Vary commands.	Solve	Solve, RunInitialGuess	no
Target	SolverName	The SolverName parameter allows you to select the solver to use for a Target sequence. Only differential corrector objects will appear on this list.	DefaultDC	Any user defined targeter	yes

Command	Option	Description/Comments	Default Value	Range	Required
Toggle	Arg	The Arg option allows the user to turn off or on the data output to the selected subscriber.	On	On,Off	yes
Toggle	OutputNames	The Toggle option allows the user to assign subscribers such as ReportFile, XYPlot, OrbitView, GrounTrackPlot or EphemerisFile to be toggled. When more than one subscriber is being toggled they need to be separated by a space.	DefaultOrbitView	Any ReportFile, XYPlot, OrbitView, GroundTrackPlot or EphemerisFile	yes
Vary	AdditiveScaleFactor	The AdditiveScaleFactor Field is used to nondimensionalize the independent variable. The solver sees only the nondimensional form of the variable. The nondimensionalization is performed using the following equation: $xn = m (xd + a)$. (xn is the non-dimensional parameter. xd is the dimensional parameter. a= additive scale factor. m= multiplicative scale factor.) Note the nondimensionalization process occurs after the perturbation to the control variable has been applied. Thus, xd represents a perturbed control variable.	0	Real Number, Array element, Variable, or any user defined parameter	no
Vary	InitialGuess	The InitialGuess option allows the user to set the initial guess for the selected Variable	0.5	Real Number, Array element, Variable, or any user-defined parameter that obeys the conditions for the selected Variable object	yes

Command	Option	Description/Comments	Default Value	Range	Required
Vary	Lower	The Lower option (only used for the Differential Corrector and fmincon solvers) is used to set the lower bound of the control Variable. Lower must be less than Upper.	0	Real Number, Array element, Variable, or any user defined para- meter (Upper > Lower)	no
Vary	MaxStep	The MaxStep option (only used for the Differential Corrector and VF13AD1 solvers) is the maximum allowed change in the control variable during a single iteration of the solver.	0.2	Real Number, Array element, Variable, or any user defined parameter > 0	no
Vary	MultiplicativeSca leFactor	The MultiplicativeScaleFactor Field is used to nondimensionalize the independent variable. The solver sees only the nondimensional form of the variable. The nondimensionalization is performed using the following equation: $xn = m (xd + a)$. (xn is the non-dimensional parameter. xd is the dimensional parameter. a= additive scale factor. m= multiplicative scale factor.) Note the nondimensionalization process occurs after the perturbation to the control variable has been applied. Thus, xd represents a perturbed control variable.	1	Real Number, Array element, Variable, or any user defined parameter > 0	no
Vary	Perturbation	The Perturbation option (only used for the Differential Corrector and VF13ad solvers) is the perturbation step sized used to calculate the finite difference derivative	0.0001	Real Number, Array element, Variable, or any user defined parameter != 0	no
Vary	SolverName	The SolverName option allows the user to choose which solver to assign to the vary command.	DefaultDC in a Target Sequence and DefaultSQP in an Optimize Sequence	Any user defined Optimizer or Targeter	yes

Command	Option	Description/Comments	Default Value	Range	Required
Vary	Upper	The Upper option (only used for the Differential Corrector and fmincon solvers) is used to set the upper bound of the control Variable. Lower must be less than Upper.	3.14159	Real Number, Array element, Variable, or any user defined para- meter (Upper > Lower)	no
Vary	Variable	The Variable option allows the user to select any single element user-defined parameter, except a number, to vary. For example, DefaultIB.V, DefaultIB.N, DefaultIB.Element1, DefaultSC.TA, Array(1,1), and Variable are all valid values. The three element burn vector or multidimensional Arrays are not valid values.	DefaultIB.Element1	Spacecraft parameter, Array element, Variable, or any other single element user-defined parameter, excluding numbers	yes