COCO - Toolbox Settings

The following settings are for each of the toolboxes included in the base COCO software: `atlas_1d`, `ode`, `ep`, `po`, and `coll`.

The options can be set with: `prob = coco_set(prob, 'TOOLBOX_NAME', [SETTING], [VALUE])`

corr − Correction Algorithm

These are found by running `ode_settings` in the Matlab console.

Setting	Description	Value Type	Default Value
ItMX	Maximum number of Newton iterations	integer	10
SubItMX	Maximum number of damping steps.	integer	4
TOL	Convergence criterion on the norm of the Newton correction	float	1e-06
ResTOL	Convergence criterion on the norm of the residuum	float	1e-06
LogLevel	Controls the amount of diagnostic output on screen. When set to zero, no output is produced.	integer	1

ode − Ordinary Differential Equations Toolbox

These are found by running `ode_settings` in the Matlab console.

Setting	Description	Value Type	Default Value
vectorized	Enable/disable vectorised evaluation	logical	true
autonomous	Indicate whether the ODE is autonomous or not	logical	true
hfac1	First-order finite-difference step size	float	1e-08
hfac2	Second-order finite-difference step size	float	1e-04

`coll` − **Trajectory Collocation Toolbox**

These are found by running `coll_settings` in the Matlab console.

Setting	Description	Value Type	Default Value
var	Enable/disable temporary storage of solution to variational problem	logical	`false`
NTST	Number of mesh intervals	integer	`10`
NCOL	Number of collocation nodes	integer	`4`
SAD	Equidistribution weight for error estimator	float	`0.95`
method	Choice of Banach iteration boundary condition	string	`'3I'`
NBeta	Number of homotopy steps for initialisation of fundamental solution	integer	`5`
NBItMX	Maximum number of Banach iterations for fundamental solution	integer	`10`
TOL	Discretisation error tolerance	float	`1e-4`
MXCL	Enable/disable termination when discretisation error exceeds tolerance	logical	`true`
TOLINC	Upper bound on discretisation error in window of adaption	float	`2e-5`
TOLDEC	Lower bound on discretisation error in window of adaption	float	`5e-6`
NTSTMN	Minimum number of discretisation intervals	integer	`5`
NTSTMX	Maximum number of discretisation intervals	integer	`100`

`cont` – Base Continuation Toolbox

These are found by running `atlas_1d_settings` in the Matlab console.

Setting	Description	Value Type	Default Value
PtMX	Maximum number of steps in either direction along the solution manifold	integer	100
NAdapt	Adaption period for mesh grid?	integer	0
h0	Initial step size	float	0.1
h_max	Maximum step size	float	0.5
h_min	Minimum step size	float	0.01
FP	Detect fold points	logical	true
fpar	Active continuation parameter for fold detection	string	''
BP	Detect branch points	logical	true
RMMX	Max number of remesh sweeps	integer	10
h_fac_max	Maximum step size adaption factor	float	2.0
h_fac_min	Minimum step size adaption factor	float	0.5
MaxRES	Maximum residual norm in prediction	float	0.1
al_max	Max angle between consecutive tangents	float	7.0
ga	Adaption security factor	float	0.95
bi_direct	Go in both directions or not	logical	true
interp	cseg interpolation	string	'cubic'
Valpha	Tolerance for "vertical tangent"	float	800.0
NullItMX	Max number of nullspace corrections	integer	0
norm	Norm for step size	float	2.0
NPR	Frequency of screen outputs	integer	10
NSV	Frequency of storing solutions to disk (default to NPR)	integer	10
corrector	Nonlinear corrector	string	'nwtn'
linsolve	Linear solver	string	'splu'
atlas	Atlas algorithm suffix	string	''

po – Periodic Orbit Toolbox

These are found by running `po_settings` in the Matlab console.

Setting	Description	Value Type	Default Value
bifus	Enable/disable detection of bifurcations	logical	true
USTAB	Monitor number of unstable eigenvalues	logical	true
SN	Detect saddle-node bifurcations	logical	true
PD	Detect period-doubling bifurcations	logical	true
TR	Detect torus bifurcations	logical	true
NSA	Detect neutral saddle points	logical	false

ep – Equilibrium Point Toolbox

These are found by running `ep_settings` in the Matlab console.

Setting	Description	Value Type	Default Value
bifus	Enable/disable detection of bifurcations	logical	true
USTAB	Monitor number of unstable eigenvalues	logical	true
SN	Detect saddle-node bifurcations	logical	true
HB	Detect Hopf bifurcations	logical	true
BTP	Detect Bogdanov-Takens points	logical	true
NSA	Detect neutral saddle points	logical	false