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])`

`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`