

## Supporting code and data from

Chaos and the (un)predictability of evolution in a changing environment  
by Artur Rego-Costa, Florence Débarre, Luis-Miguel Chevin  
2017. *Evolution* X(X). doi: XX.XX.XX

The folder contains the following scripts and data files:

### > example.R

Minimal demonstration of the simulation and analysis used in the study.

### > functions.R

Definitions of custom functions used in example.R.

### > dat\_freq\_chaos\_const\_env.csv

Dataset with the frequency of chaos at each simulation time point for different values of dimensionality (number of traits)  $d$ . 250 trajectories were run for each value of  $d$  with a constant optimum centered at zero. Chaos was identified based on the local average of their Largest Lyapunov Exponent. See Methods in the main text and SI for further information.

Variables in the dataset:

- time: simulation time;
- d: number of traits in the simulated system;
- freq\_chaos: frequency of trajectories of dimensionality  $d$  presenting chaotic behavior at the given time;

### > dat\_chang\_env\_d70.csv and dat\_chang\_env\_d40.csv

Datasets with results from all simulations of trajectories in 40 different conditions of oscillating optimum. For each combination of amplitude and period of optimum oscillation, 100 trajectories were simulated up to time  $t = 1200$ . See main text and SI for more information.

Variables in both datasets:

- cond: unique identifier of the combination of amplitude and period;
- amp: amplitude of optimum oscillation;
- per: period of optimum oscillation;
- traj\_n: number of the trajectory within the condition; trajectories of same traj\_n in different conditions were simulated with the same sets of interaction coefficients and initial phenotype;
- class: classification of the dynamics based on the local LLE at the end of the simulation (i.e.  $t = 1200$ );
- shift: shift of the optimum time-series that maximizes the fit of the linear regression between phenotype and optimum;
- r\_squared:  $R^2$  (not adjusted  $R^2$ ) of the regression model of the shifted optimum on the phenotype time-series;
- var\_res: variance of the residuals of the same regression model;
- intercept: intercept coefficient estimated with the same regression model;
- slope: slope coefficient estimated with the same regression model;
- freq: frequency of the peak spectral density of the time-series of phenotype (estimated as in section 2.3 of example.R);

- est\_slope: slope estimated with the peak spectral density WITHOUT using the interpolation method;
- freq\_interp: frequency of the peak spectral density of the time-series of phenotype using the interpolation method (as done in section 2.4 of example.R);
- est\_slope\_interp: slope estimated with the peak spectral density USING the interpolation method (as done in section 2.4 of example.R).