Readme for Code and Data for
Simple Inference for Dynamic Models with Multiple Attractors using Independent Observations

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File list:

File Name	**Description**
Beta_Params.m	**main function: convert mode and precision parameters into beta shape parameters**
boundedline.m	auxilliary function
catuneven.m	auxilliary function
fitLorenz.m	**main script: evaluate Lorenz model against data**
fminsearchbnd.m	auxilliary function
inpaint_nans.m	auxilliary function
Lorenz.m	**main script: run Lorenz model and generate time series**
Lorenz.mat	output for Fig. 5
Mean_LL_Beta.m	**main function: return negative log likelihood of mean model (only intercept) assuming beta distribution**
Mumby_LL_Beta.m	**main function: return negative log likelihood of coral model assuming beta distribution**
Mumby_multiple_linearFalsePos.m	**main script: simulate linear data and evaluate false positive on replicate sets**
Mumby_multiple_linearFalsePos.mat	output for Fig. S1
Mumby_multipleRuns_parallel.m	**main script: simulate and fit coral model on replicate sets**
Mumby_single_linearFalsePos.m	**supporting script: simulate linear data and evaluate false positive once**
Mumby_single.m	**main script: simulate data and fit coral model once**
Mumby_single.mat	output for Fig. 3
Mumby_SS.m	**main function: return sum of squares for coral model**
MumbyFit.mat	**output for Fig. 4**
outlinebounds.m	auxilliary function
singlepatch.m	auxilliary function

Instruction:
1.) Extract files into a local directory and set Matlab to that directory
2.) Run Mumby_single.m to generate a single coral-macroalgal dataset and model fit (Fig. 3)
3.) Run Mumby_multiple_linearFalsePos.m to estimate false positive rate given noisy linear data (Fig. S1)
4.) Run Mumby_multipleRuns_parallel.m to run multiple data simulation and fits (Fig. 4). Warning: runs on multiple cores and is RAM intensive
5.) Run Lorenz.m to generate bifurcation diagram for the Lorenz convection system (Fig. 5A)
6.) Run fitLorenz.m to evaluate the Lorenz model (Fig. 5B,C)