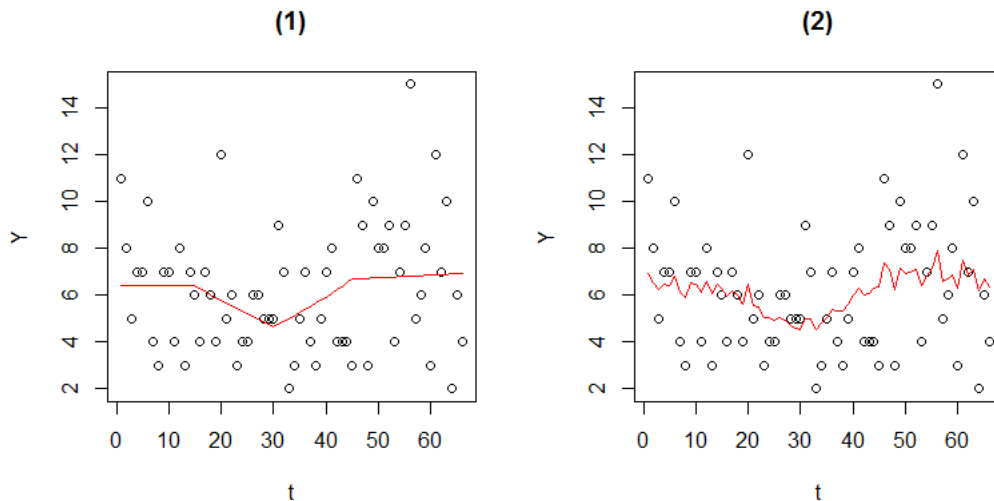


ST495/590 Assignment 6 - Solutions

(1a) *Perform thorough convergence diagnostics.*

β_j with $j = 0, 1, 2, 3$ is given normal prior with mean 0 and variance 10000 (some large value). Get the traceplot and autocorrelation plot for each β_j with $j = 0, 1, 2, 3$. The convergence is OK.

(1b) *Plot the data and the fitted data.*



(1c) *Is there evidence that the rate of hurricanes is changing over time?*

Based on the plot, no obvious evidence. The left is the plot under the prior in (1), and the right one is the plot under the prior in (2). Also, one can check the 95% posterior credible interval for β_j 's, which are listed below. Only the interval of intercept β_0 (or `beta[1]` in R code) does not contain zero. So there is no evidence that the rate of hurricanes is changing over time.

Empirical mean and standard deviation for each variable,
plus standard error of the mean:

Mean	SD	Naive SE	Time-series SE	
beta[1]	1.84555	0.09398	0.0024266	0.005687
beta[2]	-0.01865	0.01236	0.0003191	0.001284
beta[3]	0.04086	0.02390	0.0006171	0.002608

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beta[4] -0.01949 0.02143 0.0005532      0.001489
```

Quantiles for each variable:

	2.5%	97.5%
beta[1]	1.679835	2.036105
beta[2]	-0.046192	0.002035
beta[3]	-0.002705	0.094770
beta[4]	-0.068526	0.023554

(2a) *Perform thorough convergence diagnostics.*

β_j with $j = 0, 1, 2, 3$ is given normal prior with mean 0 and variance 10000 (some large value). γ_t is given $N(0, \sigma^2)$, and σ^2 is given an inverse gamma prior with small parameters, say $IG(0.001, 0.001)$.

Get the traceplot and autocorrelation plot for each β_j with $j = 0, 1, 2, 3$. The convergence is OK.

(2b) *Is there evidence that the rate of hurricanes is changing over time?*

Based on the above plot, no obvious evidence. (Similar as 1(c))

Empirical mean and standard deviation for each variable,
plus standard error of the mean:

Mean	SD	Naive SE	Time-series SE	
beta[1]	1.856705	0.10197	2.633e-03	0.006345
beta[2]	-0.022911	0.01473	3.803e-04	0.001560
beta[3]	0.049103	0.02929	7.562e-04	0.003564
beta[4]	-0.025050	0.02583	6.669e-04	0.002192
inv	241.664227	468.55428	1.210e+01	36.074458