

Code for “Time-varying sparsity in dynamic regression models” by M. Kalli and J. E. Griffin

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The code fits a dynamic regression model with NGAR prior as described in the paper. It is assumed that there are T time points and p regressors. The syntax is given below and the files beginning with “run” can be used to run the examples in the paper

```
[output] = NGAR(data, target, mumean1b, mulambdastar, burnin, ...  
numbofits, every)
```

Inputs

`data` – the data matrix which should be a $(T \times p)$ -dimensional matrix.

`target` – the target vector which should be a $(T \times 1)$ -dimensional vector.

`mumean1b` – the value of the hyperparameter b^* .

`mulambdastar` – the value of the hyperparameter s^* .

`burnin` – the number of burn-in iterations.

`numbofits` – the number of samples that are stored.

`every` – the level of thinning. In total, the sampler will be run for `burnin+every*numbofits` iterations

Outputs

`output` – a `struct` object which holds the output of the MCMC run. The fields are

`beta` – an $(T \times p \times \text{numbofits})$ -dimensional array whose (t, i, k) -th element contains the k -th sampled value of $\beta_{i,t}$.

`sigmasq` – an $(T \times \text{numbofits})$ -dimensional array whose (t, k) -th element contains the k -th sampled value of σ_t^2 .

`Psi` – an $(T \times p \times \text{numbofits})$ -dimensional array whose (t, i, k) -th element contains the k -th sampled value of $\psi_{i,t}$.

`lambda` – an $(p \times \text{numbofits})$ -dimensional array whose (i, k) -th element contains the k -th sampled value of λ_i .

`mu` – an $(p \times \text{numbofits})$ -dimensional array whose (i, k) -th element contains the k -th sampled value of μ_i .

`rhobeta` – an $(p \times \text{numbofits})$ -dimensional array whose (i, k) -th element contains the k -th sampled value of φ_i .

`rho` – an $(p \times \text{numbofits})$ -dimensional array whose (i, k) -th element contains the k -th sampled value of ρ_i .

`lambdasigma` – an (numbofits) -dimensional vector whose k -th element contains the k -th sampled value of λ^σ .

`musigma` – an (numbofits) -dimensional vector whose k -th element contains the k -th sampled value of μ^σ .

`rhosigma` – an (numbofits) -dimensional vector whose k -th element contains the k -th sampled value of ρ^σ .

`lambdastar` – an (numbofits) -dimensional vector whose k -th element contains the k -th sampled value of λ^* .

`mustar` – an (numbofits) -dimensional vector whose k -th element contains the k -th sampled value of μ^* .