Another approach

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June 2, 2015

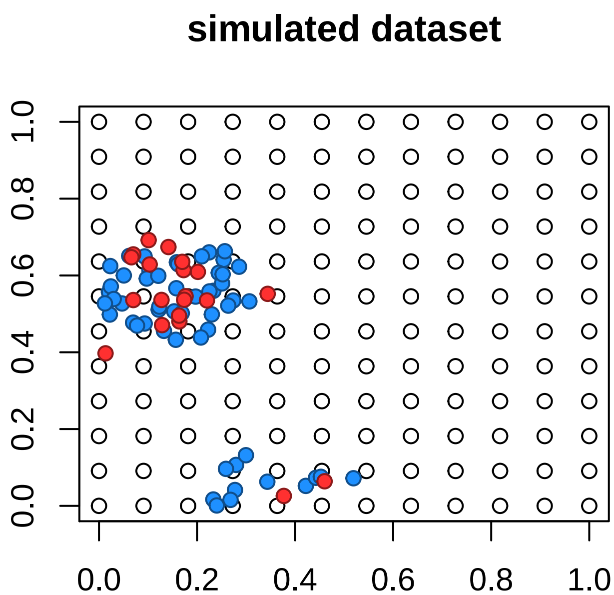
So far, I have not been able to really find a good approach that works consistently. There appears to be some challenges when trying to estimate α using the pairwise likelihood. Based on some of my previous research, it would appear that the pairwise likelihood does a reasonably good job estimating the bandwidth term ρ. Brian and I had originally discussed fixing both ρ and α in the simulation study, because when they're fixed, we can outperform spatial probit and logit. The purpose of this document is to explore what happens when we search over a grid of ρ terms and fix rho in the MCMC to $\arg\min_\rho \ell$.

Setting 1:

$\alpha = 0.2, \pi = 0.05, \rho = 0.15$

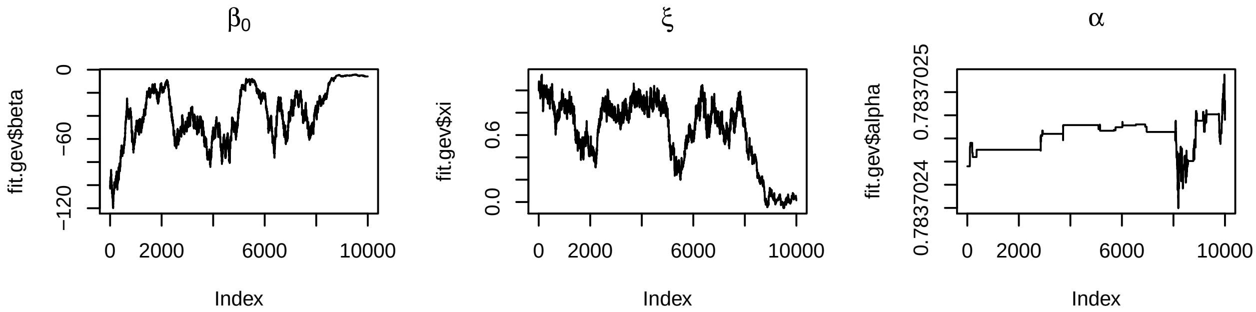
Dataset 1

From the pairwise likelihood, we'll be using $\rho = 0.1429$. The estimates for the other parameters are $\widehat{\alpha} = 0.746$, $\widehat{\xi} = 0.166$, and $\widehat{\beta}_0 = -3.879$.



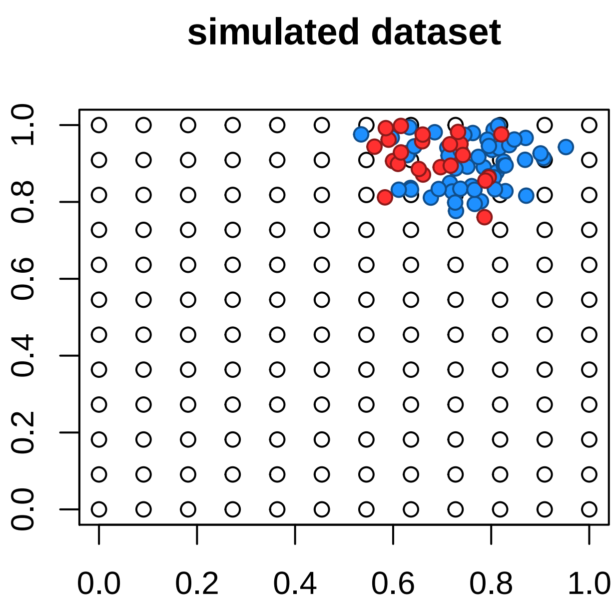
MCMC Results

Here are the iteration plots from the two GEV models. The true values are $\beta_0 = -4.407$, and $\xi = 0.25$.



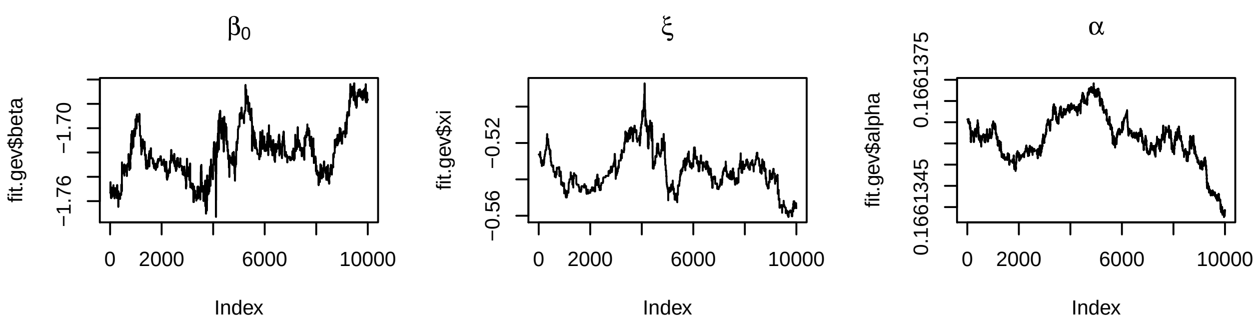
Dataset 2

From the pairwise likelihood, we'll be using $\rho = 0.1429$. The estimates for the other parameters are $\widehat{\alpha} = 0.167$, $\widehat{\xi} = 0.171$, and $\widehat{\beta}_0 = -3.964$.



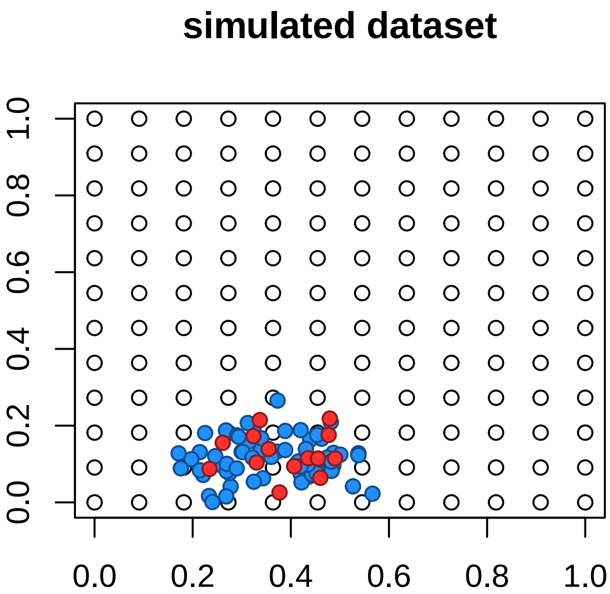
MCMC Results

Here are the iteration plots from the two GEV models. The true values are $\beta_0 = -8.297$, and $\xi = 0.25$.



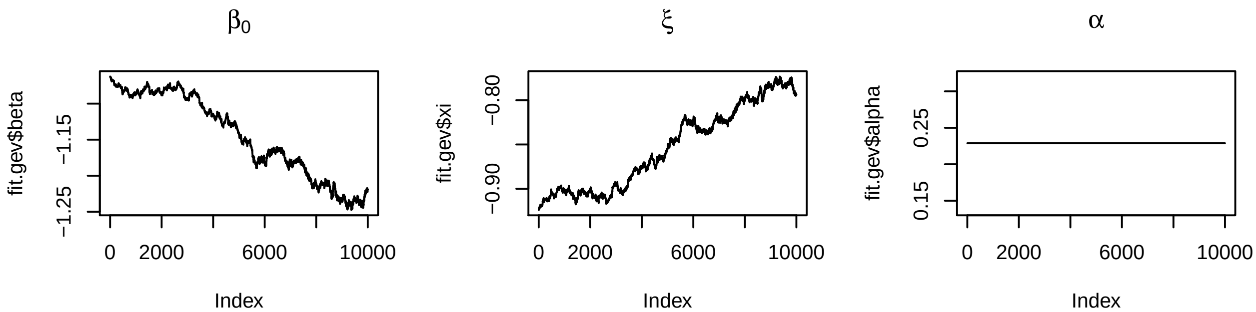
Dataset 3

From the pairwise likelihood, we'll be using $\rho = 0.1429$. The estimates for the other parameters are $\widehat{\alpha} = 0.233$, $\widehat{\xi} = 0.148$, and $\widehat{\beta}_0 = -3.597$.



MCMC Results

Here are the iteration plots from the two GEV models. The true values are $\beta_0 = -11.026$, and $\xi = 0.25$.



Brier Scores

The brier scores are

Logit 1-1: 0.0296

Probit 1-1: 0.0273

GEV 1-1: 0.0327

The brier scores are

Logit 2-1: 0.0088

Probit 2-1: 0.009

GEV 2-1: 0.0069

The brier scores are

Logit 3-1: 0.0112

Probit 3-1: 0.01

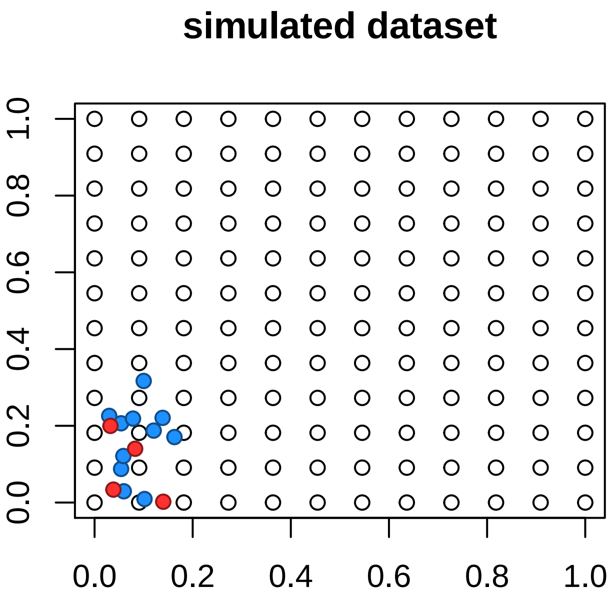
GEV 3-1: 0.0373

Setting 2:

$\alpha = 0.2, \pi = 0.01, \rho = 0.15$

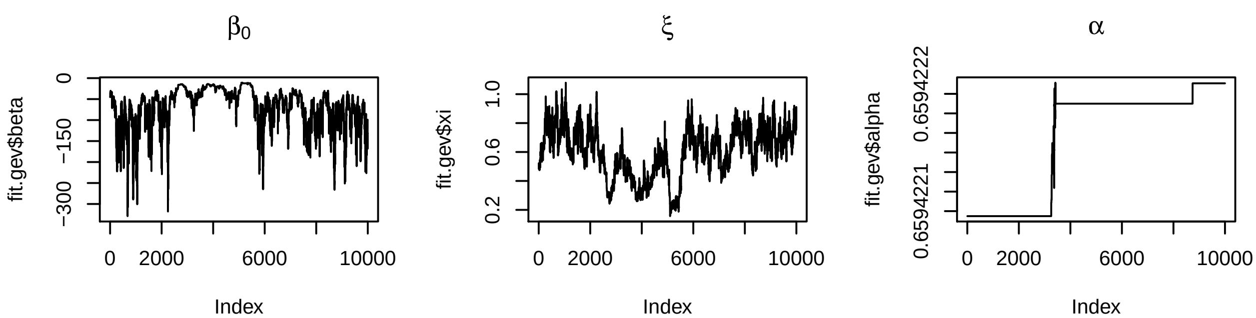
Dataset 1

From the pairwise likelihood, we'll be using $\rho = 0.1429$. The estimates for the other parameters are $\widehat{\alpha} = 0.849$, $\widehat{\xi} = -0.044$, and $\widehat{\beta}_0 = -4.179$.



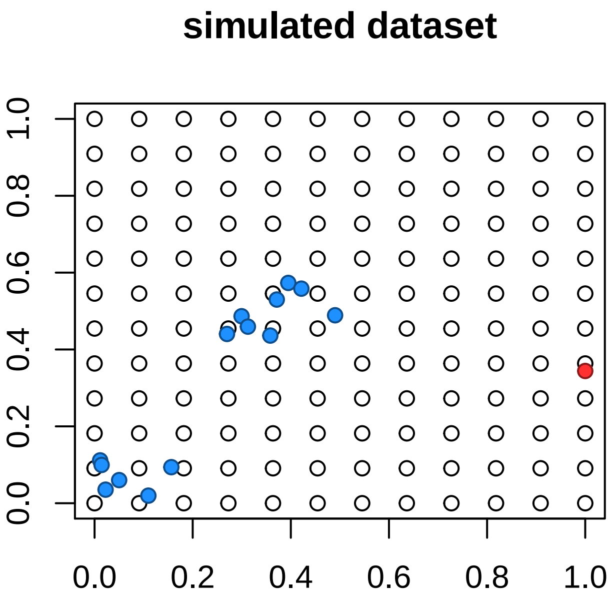
MCMC Results

Here are the iteration plots from the two GEV models. The true values are $\beta_0 = -3.901$, and $\xi = 0.25$. The estimates for the other parameters are $\widehat{\alpha} = 0.849$, $\widehat{\xi} = -0.044$, and $\widehat{\beta}_0 = -4.179$.



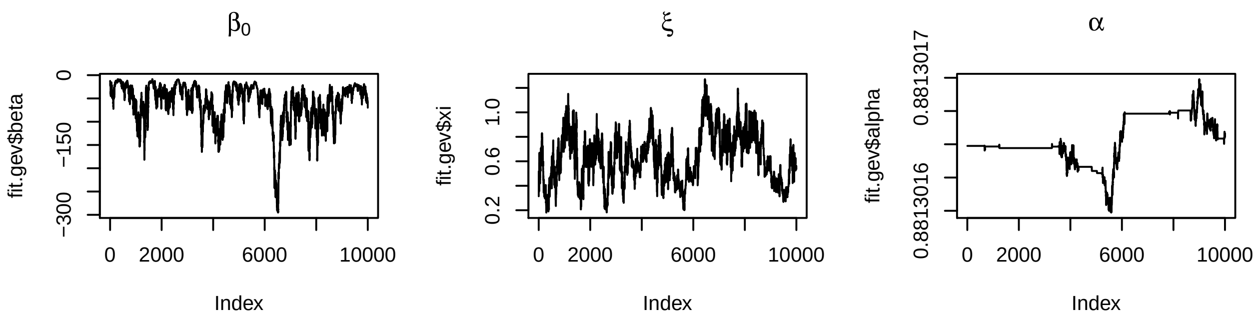
Dataset 2

From the pairwise likelihood, we'll be using $\rho = 0.1071$. The estimates for the other parameters are $\widehat{\alpha} = 0.902$, $\widehat{\xi} = -0.022$, and $\widehat{\beta}_0 = -4.178$.



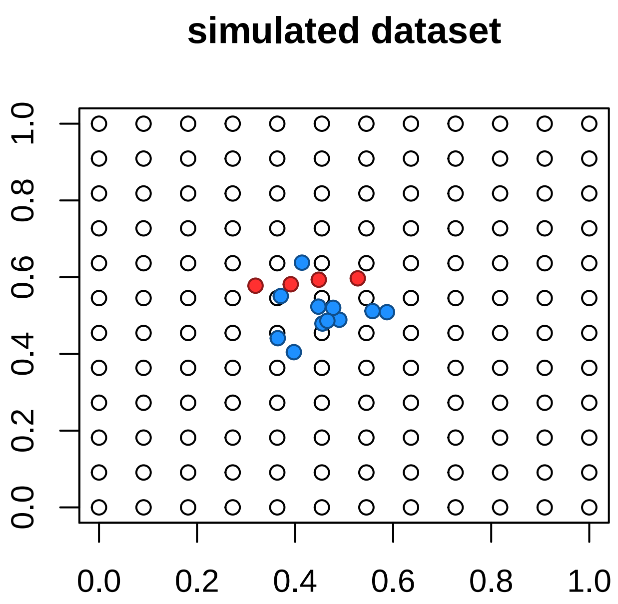
MCMC Results

Here are the iteration plots from the two GEV models. The true values are $\beta_0 = -3.052$, and $\xi = 0.25$.



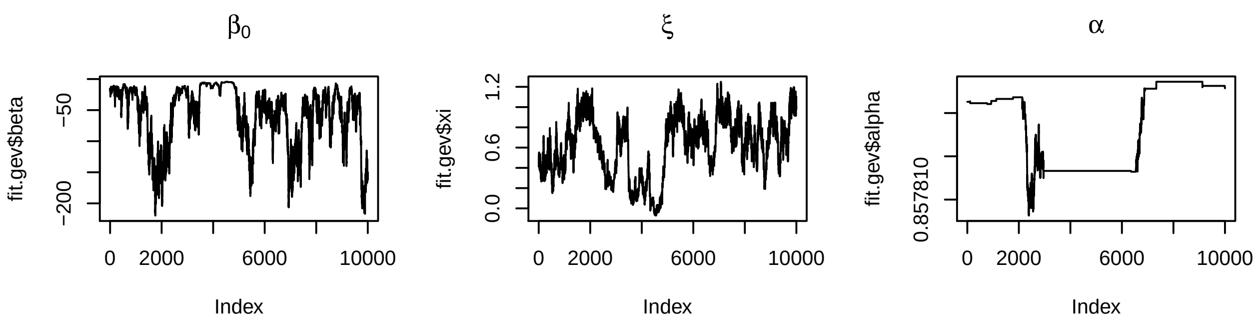
Dataset 3

From the pairwise likelihood, we'll be using $\rho = 0.1071$. The estimates for the other parameters are $\widehat{\alpha} = 0.87$, $\widehat{\xi} = -0.046$, and $\widehat{\beta}_0 = -4.164$.



MCMC Results

Here are the iteration plots from the two GEV models. The true values are $\beta_0 = -4.297$, and $\xi = 0.25$.



Brier Scores

The brier scores are

Logit 1-2: 10.56

Probit 1-2: 8.61

GEV 1-2: 10.66

The brier scores are

Logit 2-2: 2.75

Probit 2-2: 3.19

GEV 2-2: 2.65

The brier scores are

Logit 3-2: 10.81

Probit 3-2: 10.68

GEV 3-2: 10.61