Assignment3

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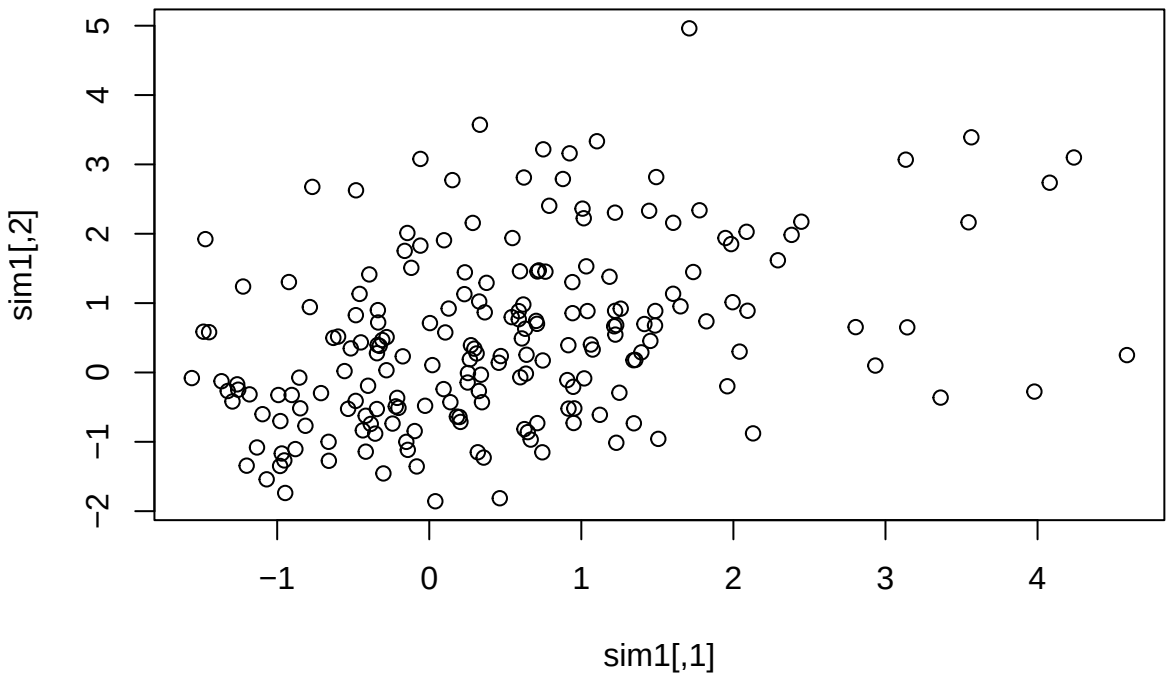
2023-10-04

\section(Random number generation from bivariate EVD) \subsection(Parametric bivariate EV models) In the package `evd` the nine models and their respective dependence and asymmetry parameters are:

- Logistic. Dependence parameter `r` between (0,1]. Smaller `r` implies higher dependence.
- Asymmetrix logistic. Dependence parameter r, as in (symmetric) Logistic. Asymmetry parameters are $\texttt{t}_1$ and $\texttt{t}_2$. Indepence if any of $\texttt{t}_1, \texttt{t}_2$ are 0 or `r = 1`. For complete dependence $\texttt{t}_1 = \texttt{t}_2$=1 and $\texttt{r} \to 0$.
- Husler-Reiss. Dependence parameter $\texttt{r} \in (0, \text{inf})$. Full dependence as $\texttt{r} \to \text{inf}$, and independence as $\texttt{r} \to 0$
- Negative logistic. Dependence parameter $\texttt{r} > 0$. Higher `r` implies higher dependence.
- Asymmetric negative logistic. Dependence parameter $\texttt{r} > 0$ and asymmetry parameters $\texttt{t}_1, \texttt{t}_2 \in (0, 1]$. Indepence if any of $\texttt{t}_1, \texttt{t}_2, \texttt{r}$ approaches 0. Complete dependence if $\texttt{t}_1, \texttt{t}_2 = 1, 1$ and $\texttt{r} \to \text{inf}$.
- Bilogistic. Parameters α, β. When $\alpha = \beta$ the model is equivalent to logistic with dependence parameter $\texttt{r} = \alpha$. As in logistic, when $\alpha = \beta = \texttt{r} \to 0$ the model tends to complete dependence. Independence as either both tends to 1, or one is fix and other tends to 1.
- Negative bilogistic Parameters α, β. When $\alpha = \beta$ the model is equivalent to negative bilogistic with dependence parameter $\texttt{r} = 1\alpha$. When $\alpha = \beta \to 0$ the model tends to complete dependence. Independence as either both tends to inf, or one is fix and other tends to inf.
- Coles-Tawn. Parameters $\alpha, \beta > (0, 0)$. As $\alpha = \beta \to \text{inf}$ the model shows complete dependence. Independence as either both tends to 0, or one is fix and other tends to 0.
- Asymmetric mixed distribution. Parameters α, β fulfill the following conditions: α and $\alpha + 3\beta > 0$, and $\alpha + 2\beta$, $\alpha + \beta \leq 1$ As β is fix, the strength of dependence increases with α. Complete dependence is not achievable. Independence as $\alpha = \beta = 0$.

```
sim1 = rbvevd(200,dep=1, model = "hr") #HR
plot(sim1)
```


sim1[,2]
5
4
3
2
1
0
−1
−2
−1
0
1
2
3
4
sim1[,1]