

Asser's Guide to the POT Package (Version 1.0)

Mathieu Ribatet

Copyright

with

$$H(y) = 1 - \frac{1}{1 + y}$$

Definitio A bivariate extreme value distribution has the Pickands' representation

$$G(y_1, y_2) = \exp \left\{ - \left(\frac{1}{z_1} + \frac{1}{z_2} \right) A \left(\frac{z_2}{z_1 + z_2} \right) \right\} \tag{2.6}$$

with

$$A : [0, 1] \rightarrow [0, 1]$$
$$w \rightarrow$$

```

    d 6 0 2 3 0
[1 2.9850 40 3.1486256 1.0 05649 0. 401 53 3.123151 2.3994109
##P babi i f x d
    d 9 15 20 1 2 0.25
[1 0.93 5000 0.9825149 0.992292
## ua i a ia d babi i f x d
    d .25 .5 .5 1 2 0
[1 1.5 5364 2.386294 3. 2589
##Eva ua h d i a i ...
    d d 9 15 20 1 2 0.25
[1 0.015625000 0.0031 911 0.001141829

```

Sever l ti s c be ssed t three f these f r f cti s. I rtic l r

- f r² d", ser c s ecif if excede ce r excede ce r b bilit sh ld be c m ted
with ti w . ai TR E r w . ai FALSE res ectivel
- f r² d", ser c s ecif if tile is rel ted t excede ce r excede ce r b bilit
with ti w . ai TR E r w . ai FALSE res ectivel
- f r² d d", ser c s ecif if the de sit r the l -de sit sh ld be c m ted with ti
FALSE r TR E res ectivel .

3 2 Threshold Sele t on

The l c ti f r the GPD re iv le tl the thresh ld is rtic l r r meter s m st fte it
is t estim ted s the ther es. All meth ds t defi es it ble thresh ld se the s m t tic
r xim ti defi ed b e ti 2.). I ther rds, we select thresh ld f r which the
s m t tic distrib ti H i e ti 2.4) is d r xim ti .

The **POT** ck e h s sever l t ls t defi e s ble thresh ld. r this r se, the ser
m st se xi d di f cti s.

The m i l f thresh ld selecti is t selects e h eve ts t red ce the v ri ce b t t

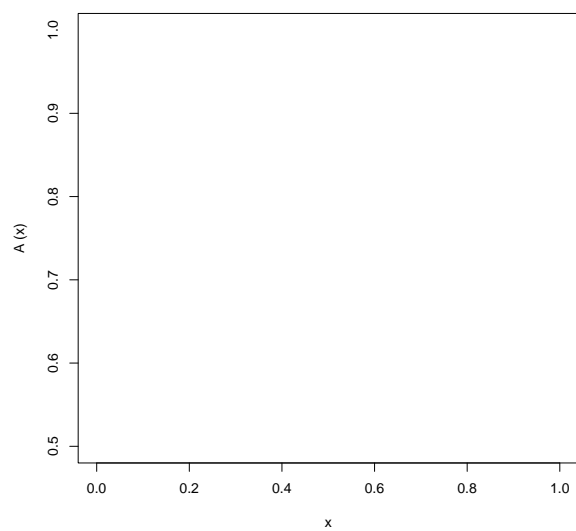
If we fit GPD with variable threshold, just d

x - d 500 1 2 0.3 0.01
fi d x 1 2 h d " "

Note that the variability threshold is re-evaluated cyclically until it matches the length of object \mathbf{x} .

The bivariate case

The effective fit biv ri te POTs is **fitbv d**. There is c rre tl 6 m dels f r the biv ri tes GPD see A exe A. All f these m dels re fitted si m xim m likelih d estim t r. More ver, the r ch ses e e

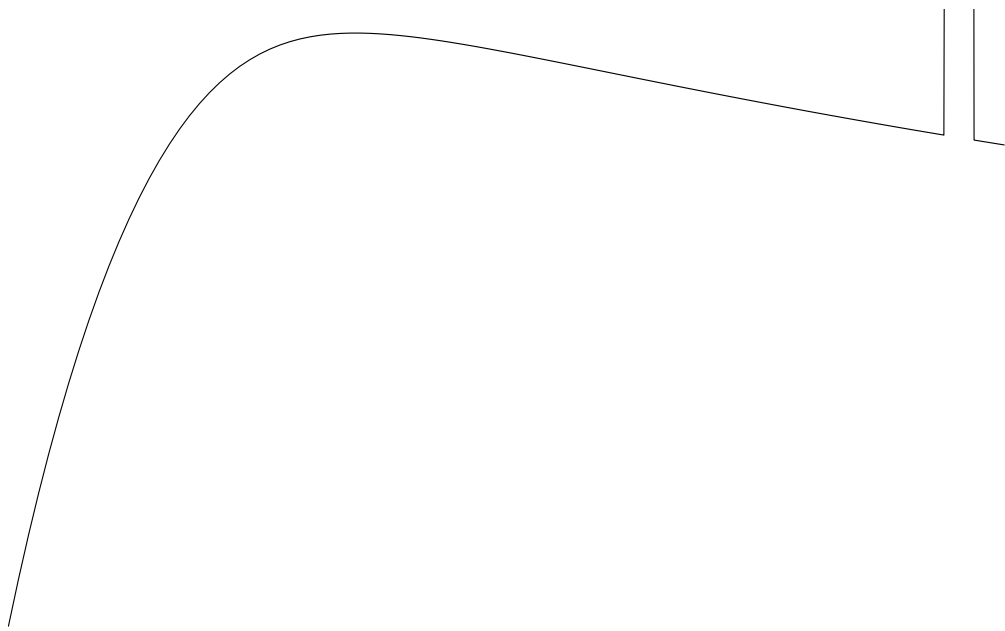


0	i	i	a	i	I	f	a	i	
	C	v				u		fu	
	Fu		i		Eva	ua	i		2
	G	adi			Eva	ua	i		13

3.4 Con dence Intervals

Once the statistical model is fitted, it is solved by the following steps:

- (1) The initial values are set as follows: $\beta_0 = 0$, $\beta_1 = 0$, $\beta_2 = 0$, $\beta_3 = 0$, $\beta_4 = 0$, $\beta_5 = 0$, $\beta_6 = 0$, $\beta_7 = 0$, $\beta_8 = 0$, $\beta_9 = 0$, $\beta_{10} = 0$, $\beta_{11} = 0$, $\beta_{12} = 0$, $\beta_{13} = 0$, $\beta_{14} = 0$, $\beta_{15} = 0$, $\beta_{16} = 0$, $\beta_{17} = 0$, $\beta_{18} = 0$, $\beta_{19} = 0$, $\beta_{20} = 0$, $\beta_{21} = 0$, $\beta_{22} = 0$, $\beta_{23} = 0$, $\beta_{24} = 0$, $\beta_{25} = 0$, $\beta_{26} = 0$, $\beta_{27} = 0$, $\beta_{28} = 0$, $\beta_{29} = 0$, $\beta_{30} = 0$, $\beta_{31} = 0$, $\beta_{32} = 0$, $\beta_{33} = 0$, $\beta_{34} = 0$, $\beta_{35} = 0$, $\beta_{36} = 0$, $\beta_{37} = 0$, $\beta_{38} = 0$, $\beta_{39} = 0$, $\beta_{40} = 0$, $\beta_{41} = 0$, $\beta_{42} = 0$, $\beta_{43} = 0$, $\beta_{44} = 0$, $\beta_{45} = 0$, $\beta_{46} = 0$, $\beta_{47} = 0$, $\beta_{48} = 0$, $\beta_{49} = 0$, $\beta_{50} = 0$, $\beta_{51} = 0$, $\beta_{52} = 0$, $\beta_{53} = 0$, $\beta_{54} = 0$, $\beta_{55} = 0$, $\beta_{56} = 0$, $\beta_{57} = 0$, $\beta_{58} = 0$, $\beta_{59} = 0$, $\beta_{60} = 0$, $\beta_{61} = 0$, $\beta_{62} = 0$, $\beta_{63} = 0$, $\beta_{64} = 0$, $\beta_{65} = 0$, $\beta_{66} = 0$, $\beta_{67} = 0$, $\beta_{68} = 0$, $\beta_{69} = 0$, $\beta_{70} = 0$, $\beta_{71} = 0$, $\beta_{72} = 0$, $\beta_{73} = 0$, $\beta_{74} = 0$, $\beta_{75} = 0$, $\beta_{76} = 0$, $\beta_{77} = 0$, $\beta_{78} = 0$, $\beta_{79} = 0$, $\beta_{80} = 0$, $\beta_{81} = 0$, $\beta_{82} = 0$, $\beta_{83} = 0$, $\beta_{84} = 0$, $\beta_{85} = 0$, $\beta_{86} = 0$, $\beta_{87} = 0$, $\beta_{88} = 0$, $\beta_{89} = 0$, $\beta_{90} = 0$, $\beta_{91} = 0$, $\beta_{92} = 0$, $\beta_{93} = 0$, $\beta_{94} = 0$, $\beta_{95} = 0$, $\beta_{96} = 0$, $\beta_{97} = 0$, $\beta_{98} = 0$, $\beta_{99} = 0$.
- (2) The first iteration is performed.
- (3) The second iteration is performed.
- (4) The third iteration is performed.
- (5) The fourth iteration is performed.
- (6) The fifth iteration is performed.
- (7) The sixth iteration is performed.
- (8) The seventh iteration is performed.
- (9) The eighth iteration is performed.
- (10) The ninth iteration is performed.
- (11) The tenth iteration is performed.
- (12) The eleventh iteration is performed.
- (13) The twelfth iteration is performed.
- (14) The thirteenth iteration is performed.
- (15) The fourteenth iteration is performed.
- (16) The fifteenth iteration is performed.
- (17) The sixteenth iteration is performed.
- (18) The seventeenth iteration is performed.
- (19) The eighteenth iteration is performed.
- (20) The nineteenth iteration is performed.
- (21) The twentieth iteration is performed.
- (22) The twenty-first iteration is performed.
- (23) The twenty-second iteration is performed.
- (24) The twenty-third iteration is performed.
- (25) The twenty-fourth iteration is performed.
- (26) The twenty-fifth iteration is performed.
- (27) The twenty-sixth iteration is performed.
- (28) The twenty-seventh iteration is performed.
- (29) The twenty-eighth iteration is performed.
- (30) The twenty-ninth iteration is performed.
- (31) The thirtieth iteration is performed.
- (32) The thirty-first iteration is performed.
- (33) The thirty-second iteration is performed.
- (34) The thirty-third iteration is performed.
- (35) The thirty-fourth iteration is performed.
- (36) The thirty-fifth iteration is performed.
- (37) The thirty-sixth iteration is performed.
- (38) The thirty-seventh iteration is performed.
- (39) The thirty-eighth iteration is performed.
- (40) The thirty-ninth iteration is performed.
- (41) The fortieth iteration is performed.
- (42) The forty-first iteration is performed.
- (43) The forty-second iteration is performed.
- (44) The forty-third iteration is performed.
- (45) The forty-fourth iteration is performed.
- (46) The forty-fifth iteration is performed.
- (47) The forty-sixth iteration is performed.
- (48) The forty-seventh iteration is performed.
- (49) The forty-eighth iteration is performed.
- (50) The forty-ninth iteration is performed.
- (51) The fiftieth iteration is performed.
- (52) The fifty-first iteration is performed.
- (53) The fifty-second iteration is performed.
- (54) The fifty-third iteration is performed.
- (55) The fifty-fourth iteration is performed.
- (56) The fifty-fifth iteration is performed.
- (57) The fifty-sixth iteration is performed.
- (58) The fifty-seventh iteration is performed.
- (59) The fifty-eighth iteration is performed.
- (60) The fifty-ninth iteration is performed.
- (61) The sixtieth iteration is performed.
- (62) The sixty-first iteration is performed.
- (63) The sixty-second iteration is performed.
- (64) The sixty-third iteration is performed.
- (65) The sixty-fourth iteration is performed.
- (66) The sixty-fifth iteration is performed.
- (67) The sixty-sixth iteration is performed.
- (68) The sixty-seventh iteration is performed.
- (69) The sixty-eighth iteration is performed.
- (70) The sixty-ninth iteration is performed.
- (71) The seventieth iteration is performed.
- (72) The seventy-first iteration is performed.
- (73) The seventy-second iteration is performed.
- (74) The seventy-third iteration is performed.
- (75) The seventy-fourth iteration is performed.
- (76) The seventy-fifth iteration is performed.
- (77) The seventy-sixth iteration is performed.
- (78) The seventy-seventh iteration is performed.
- (79) The seventy-eighth iteration is performed.
- (80) The seventy-ninth iteration is performed.
- (81) The eightieth iteration is performed.
- (82) The eighty-first iteration is performed.
- (83) The eighty-second iteration is performed.
- (84) The eighty-third iteration is performed.
- (85) The eighty-fourth iteration is performed.
- (86) The eighty-fifth iteration is performed.
- (87) The eighty-sixth iteration is performed.
- (88) The eighty-seventh iteration is performed.
- (89) The eighty-eighth iteration is performed.
- (90) The eighty-ninth iteration is performed.
- (91) The ninetieth iteration is performed.
- (92) The ninety-first iteration is performed.
- (93) The ninety-second iteration is performed.
- (94) The ninety-third iteration is performed.
- (95) The ninety-fourth iteration is performed.
- (96) The ninety-fifth iteration is performed.
- (97) The ninety-sixth iteration is performed.
- (98) The ninety-seventh iteration is performed.
- (99) The ninety-eighth iteration is performed.
- (100) The ninety-ninth iteration is performed.



4 A Concrete Statistical Analysis of α versus β threshold

In this section,

∞⁰

A 5 The Mixed model

The mixed model is defined by

$$V($$

C. Klügelber and A. M. . Bivari te extreme v l e distrib ti s b sed l mi l de e -
de ce f cti s. *M th Meth A l* , 29 12) 1467 148 , 2 6. ISSN 17 4214 ISSN).

C. Klügelber and T. Miksch. L r e devi ti s f he v -t iled r d m s ms with lic ti s
i i s r ce d fi ce. *J u l A l e P l t* , .ci29 rd 8j6.72l 2eTd tisc 8e7116 54.47922.56 2Td L

St tistic l I stit te, 1981.

. III Pick ds. St tistic l i fere ce si extreme rder st tistics. *A l 3 3 t t t R3*

t e3 R Ae 3e 3 u e 3 E e t 3 t t t 3 l ut R3
.R- . .

3e