OUTLIER DETECTION MAGNITUDE

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Magnitude indexes

$$I_{M_1} = \left| \frac{1}{n} \sum_{j=1}^{n} \overline{x} - \beta_j \cdot \overline{x_j} \right| = \left| \frac{1}{n} \sum_{j=1}^{n} \overline{x} - \frac{Cov(x, x_j)}{var(x_j)} \cdot \overline{x_j} \right|$$

Magnitude with beta equal to tau-kendall per MAD

$$I_{M_2} = \left| \frac{1}{n} \sum_{j=1}^{n} \overline{x} - \beta_j \cdot \overline{x_j} \right| = \left| \frac{1}{n} \sum_{j=1}^{n} \overline{x} - \tau(x, x_j) \cdot MAD(x) \cdot \overline{x_j} \right|$$

Magnitude with beta equal to tau-kendall per MAD

$$I_{M_2} = \left| \frac{1}{n} \sum_{j=1}^{n} \overline{x} - \beta_j \cdot \overline{x_j} \right| = \left| \frac{1}{n} \sum_{j=1}^{n} \overline{x} - r_b(x, x_j) \cdot MAD(x) \cdot \overline{x_j} \right|$$

```
## $MEASURES.MUODMAG
##               c          f          F
## boxplot     100 0.00000000 1.0000000
## adjboxplot  100 0.03092784 0.9966667
## adjout        0 0.00000000 0.0000000
## meanvar     100 0.00000000 1.0000000
## carlings    100 0.00000000 1.0000000
## madmedian   100 0.00000000 1.0000000
## ifourths    100 0.00000000 1.0000000
## tangent     100 0.66015277 0.9491980
##
## $MEASURES.KENDALL
##                  c          f          F
## boxplot     99.48333 0.00000000 0.9972313
## adjboxplot  81.93885 0.00000000 0.8607578
## adjout       0.00000 0.00000000 0.0000000
## meanvar     96.20819 0.00000000 0.9775246
## carlings    97.81270 0.00000000 0.9879604
## madmedian   94.81342 0.01020408 0.9663092
## ifourths    99.40000 0.00000000 0.9967118
## tangent    100.00000 2.48110748 0.8292835
##
## $MEASURES.BIWEIGHT
##                  c          f          F
## boxplot     98.27103 0.00000000 0.9905318
## adjboxplot  86.18517 0.00000000 0.8944324
## adjout       0.00000 0.00000000 0.0000000
## meanvar     94.45343 0.00000000 0.9672646
## carlings    94.61501 0.00000000 0.9684977
## madmedian   91.04430 0.01020408 0.9410127
```

```
## ifourths    98.27103 0.00000000 0.9905318
## tangent     100.00000 2.88573332 0.8095613
```