The generalized Pareto distribution is used to generate random samples as follows:

$$x = \frac{(1-u)^{-\kappa} - 1}{\kappa}$$

where x quantile distribution function to the generalized Pareto distribution, and u uniform random variables.

I used two methods to estimate the parameters, *the first approach* is based on the original data to estimate the parameters,

$$\hat{\kappa}^{new} = \frac{\hat{\kappa}^{original}}{1 + n + n\hat{\kappa}^{original}}$$
$$\hat{\sigma}^{new} = \frac{\hat{\sigma}^{original}}{1 + n + n\hat{\kappa}^{original}}$$

where $\hat{\kappa}^{original} = 0.972$ and $\hat{\sigma}^{original} = 1.03$ (using original data), then $\hat{\kappa}^{original} = 0.327$ and $\hat{\sigma}^{new} = 0.34$.

The secound approch is based on the Table 1 in your paper:

$$\mu_2^(3) = \frac{2\sigma^2}{3(3+\kappa)}$$
$$2\sigma^2 = 3(3+\kappa)\mu_2^(3)$$
$$\sigma^2 = \frac{3(3+\kappa)\mu_2^{(3)}}{2}$$

then

$$\hat{\sigma}^2 = \frac{3(3+\hat{\kappa})\hat{\mu}_2^{(3)}}{2} \tag{0.1}$$

Where $\hat{\mu}_2^{(3)} = \frac{1}{N^{(3)}} \sum_{i=1}^{N^{(3)}} x_i^{(3)}$ as in your paper then from data after partition samples into triplets we got $\hat{\mu}_2^{(3)} = 0.521 \;\; 0.521 \;\; 0.521$ we apply the result in the 0.1,

$$\hat{\sigma}^2 = \frac{3(3+0.972) * 0.521}{2}$$
$$\hat{\sigma}^2 = 3.103$$
$$\hat{\sigma} = 1.762 \neq 0.34.$$

that means the two methods are not equal?
Did I make a mistake in using your method or is there a misunderstanding?

I used my method (in the thesis) to estimate κ from original data, should I use the data after partition?

Below is the result of the Matlab program to IA method.

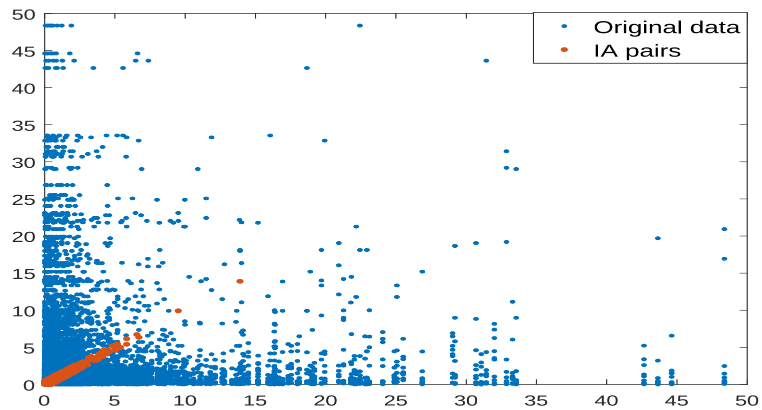

Figure 1: Using generalized Pareto distribution to selection Parise of Independent Approximates within a range of 0.5

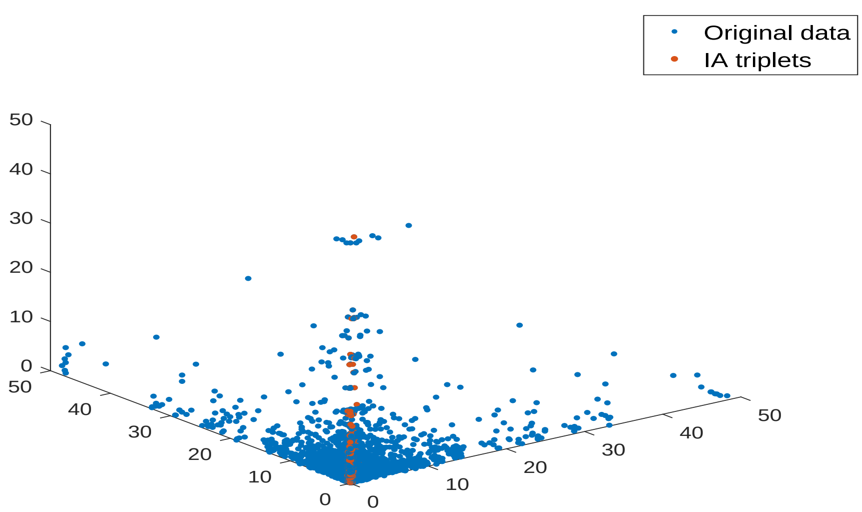

Figure 2: Using generalized Pareto distribution to selection triplets of Independent Approximates within a range of 0.5