The steps of the method:

- Generate data (x) have student distribution.
- Arrange the data in ascending order.
- We calculate $s_j = j/n,\ j = \lceil na \rceil, \dots, \lfloor nb \rfloor,\ a < b$ are fixed constants taken from the interval (0,1).
  In my program I take $a = 0.0001, b = 0.4$ where do we get the best results. Then number value of j it should be $nn = floor(n * b) - ceil(n * a) + 1$ and n sample size that you Generate it. In this case we used loop as follows:

  ```
  for jj=1:nn;
  s1(jj)=ceil(n*a)+(jj-1);
  end
  ```
  Finally we find s_j as $s = s1/n$
- To clarify the unclear part:
  We obtain the regression equations from the following equation:

  $$\log Q_n(1 - s_j) = -\alpha \log s_j + \theta_0 + 2 \sum_{k=1}^{\widetilde{p}} \theta_k \cos(2\pi k s_j),$$

  I take $\widetilde{p} = 2$ then the equation becomes

  $$\log Q_n(1 - s_j) = -\alpha \log s_j + \theta_0 + 2\cos(2\pi s) + 2\cos(4\pi s),$$

  we have to calculate the left-hand side, as you see it is Quantile function, we will use the theorem that says:

  $$Q_n(s) = X_{k,n} \qquad \text{if} \quad \frac{k-1}{n} < s \leq \frac{k}{n}, \quad k = 1, 2, \dots, n.$$

  but instead of s we have $1 - s$ (left tail) so

  $$\frac{n-k}{n} < s \leq \frac{n+1-k}{n}$$

  in my program I take k as ir and $Qn = sort(x)$
  I find it as the following code:

$for\, j = 1 : nn$
$for\, ir = 1 : n$
$if(s(j)) > ((n - ir)/n) and (s(j)) \leq ((n + 1 - ir)/n);$
$Qt(j) = Qn(ir);$
end
end
end

- Then $y = log(Qt)$
- Our estimater is $\hat{\kappa} = e_1'(X'WX)^{-1}X'Wy$, Where X is matrix as $[x_1 \;\; x_0 \;\; x_2 \;\; x_3]$ where x_0 is vector all values are one, $x_1 = -(\log(s))$, $x_2 = (2 * \cos(2 * pi * s))$, $x_3 = (2 * cos(4 * pi * s))$, $W = s$ and $e = [1 \;\; 0 \;\; 0 \;\; 0]$.