1. drop concrete instants of time
2. treat remaining data as one-dimensional
   a.k.a. dog-man distance: when the maximum distance a point on the deformed into the adjustment plurality of analysis techniques exists differ too much when Sampling rates or lengths most of them hardly applicable
3. comparison based on continuous dissimilarity measure for curves
   polygonal curve
   - 
   fallback-option [Driemel et al. (SODA '16) ]
running-time: input: two polygonal curves
Alt-Godau algorithm
  1. obtain a Johnson-Lindenstrauss projection for all vertices of all curves
  2. apply projection to all vertices
  3. re-connect vertices with edges, in order

  with positive constant probability the following bounds hold:
  \[ d_P(\sigma, \tau) \leq \sqrt{(1 + \epsilon) d_G(\sigma, \tau) + 2\alpha(\epsilon, \tau)^2} \]
  \[ \sqrt{(1 - \epsilon) d_G(\sigma, \tau) - 2\alpha(\epsilon, \tau)^2} \leq d_P(\sigma, \tau) \]
  \( \alpha(\epsilon, \tau) \): length of longest edge of both curves
  target dimension: \( O(\epsilon^{-2} \log(m)) \)

Johnson-Lindenstrauss Embedding for Polygonal Curves

reduction of complexity?

let \( E, S \) be data oblivious randomized functions such that
\[ d_P(\sigma, \tau) \leq E(S(\sigma), \tau) \leq c \cdot d_P(\sigma, \tau) \]
holds with positive constant probability

For \( c \in [1, \sqrt{2}] \) the sketch \( S(\sigma) \) must use \( \Omega(m) \) bits
one can not obtain a \( (1 + \epsilon) \) approximation by reducing the dependency on \( M \).

parallelized Frechet distance computation with parallelism.

Reduction of the curve's complexity?

1. uniformly at random, draw a candidate sample
2. uniformly at random, draw a witness sample
3. evaluate each candidate using the witnesses
4. return a candidate that evaluates best

\[ \mathcal{O}\left(\frac{1}{\epsilon^2 \gamma(T)}\right) \] candidates sufficient
\[ \mathcal{O}\left(\frac{\ln(1/\epsilon) - \gamma(T)}{\epsilon^2}\right) \] witnesses sufficient

to obtain \( (1 + \epsilon) \) Median with positive constant probability
\( \gamma(T) \): fraction of outliers in \( T \)
can serve as plugin for k-median \((1 + \epsilon)\) approximation.
[Ackermann et al. (TALG '10)]