Algorithm 1: CCC algorithm

Function `get_partitions`($\mathbf{v}$, $k_{\max}$):

  Input:

    $\mathbf{v}$: feature values on n objects

    $k_{\max}$: maximum number of clusters

  Output:

    Π: a set of partitions over n objects

  if $\mathbf{v} \in \mathbb{R}^n$ **then**

    for $k \leftarrow 2$ **to** $\min\{k_{\max}, n-1\}$ **do**

      $\boldsymbol{\rho} \leftarrow (\rho_\ell \mid \Pr(v_i < \rho_\ell) \leq (\ell-1)/k), \forall \ell \in [1, k+1]$

      $\pi_\ell \leftarrow \{i \mid \rho_\ell < v_i \leq \rho_{\ell+1}\}, \forall \ell \in [1, k]$

      $\Pi_k \leftarrow \pi$

  else

    $\mathcal{C} \leftarrow \{v_i | v_i \in \mathbf{v}\}$

    $k \leftarrow |\mathcal{C}|$

    $\pi_c \leftarrow \{i \mid v_i = \mathcal{C}_c\}, \forall c \in [1, k]$

    $\Pi_k \leftarrow \pi$

  $\Pi \leftarrow \{\Pi_k \mid |\Pi_k| > 1\}, \forall k$

  return Π

Function `ccc`($\mathbf{x}$, $\mathbf{y}$, $k_{\max}$):

  Input:

    $\mathbf{x}$: feature values on n objects

    $\mathbf{y}$: feature values on n objects

    $k_{\max}$: maximum number of clusters

  Output:

    c: correlation value for $\mathbf{x}$ and $\mathbf{y}$ ($c \in [0, 1]$)

  $\Pi^{\mathbf{x}} =$ get_partitions($\mathbf{x}$, $k_{\max}$)

  $\Pi^{\mathbf{y}} =$ get_partitions($\mathbf{y}$, $k_{\max}$)

  $c \leftarrow \max\{\text{ARI}(\pi_j, \pi_l)\}, \forall \pi_j \in \Pi^{\mathbf{x}}, \pi_l \in \Pi^{\mathbf{y}}$

  return $\max(c, 0)$