BRIEF ARTICLE

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1. Assumptions

(1) The samples for each centroid are evenly divided on each side of the centroid
(2) The samples between centroids are uniformly distributed
(3) If a centroid has $n = 2k + 1$ samples, then there are k samples on each side and one at the centroid
(4) If a centroid has $n = 2k$ samples, then there $k - 1/2$ samples on each side
(5) the first and last centroid will have only one sample

2. Equal Spacing Model

Take two centroids separated by x with $n_{\texttt{left}}$ and $n_{\texttt{right}}$ samples respectively. We know the following about the samples between these centroids

(1) there will be no samples left of the first centroid or right of the last one
(2) if $n_{\texttt{left}} = 1$ or $n_{\texttt{right}} = 1$ then the unique sample for the corresponding centroid is at the centroid
(3) there will be $\lfloor n_{\texttt{left}}/2 \rfloor + \lfloor n_{\texttt{right}}/2 \rfloor$ samples between the centroids
(4) samples will be spaced $\Delta x = 2x/(n_{\texttt{left}} + n_{\texttt{right}})$ apart
(5) the left-most sample is at $((n_{\texttt{left}} \mod 2) + 1)\Delta x/2$ from the left centroid
(6) the right-most sample is at $((n_{\texttt{right}} \mod 2) + 1)\Delta x/2$ from the left centroid