

Classification_of_Tweets

December 19, 2020

1 Project Data Mining

2 Thème : Classification et clustering des tweets en Python

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3.1 Objectifs :

- Maîtriser l'API de twitter pour l'extraction des tweets
- Appliquer les principes de nettoyage des données
- Maîtriser la partie NLP (natural language processing) avec NLTK en Python
- Classer les tweets : regrouper ensemble les tweets qui sont similaires

3.2 Twitter

Twitter est un service de réseautage social et de micro-blogging sur lequel les utilisateurs publient et interagissent les uns avec les autres via des messages appelés «tweets». Il est classé au 6e rang des sites et applications de réseautage social les plus populaires par Dream Grow en avril 2020 avec une moyenne de 330 millions d'utilisateurs actifs par mois.

3.3 Spécifications :

Imaginons que vous avez un compte Twitter, et que vous lez suivre les tweets (texte très court) sur ce réseau social. Vu le nombre colossal de Tweets, et faute de temps, vous n'avez pas la possibilité de les lire tous. Pour cela, vous avez besoin d'une application qui va jouer le rôle d'assistant et qui va vous effectuer un résumé de toutes ces informations. Une des approches qu'on peut utiliser est de le classer sous forme de groupes de sorte à ce qu'on présente à l'utilisateur un seul Tweet de chaque groupe.

3.4 Travail à Faire :

- On a Télécharger les tweets à partir de Twitter en utilisant l'API de twitter. Pour cela, vous devriez un compte « Twitter Developer ». Pour cela, vous devriez télécharger au moins 10 mille tweets.
- On Utiliser la bibliothèque NLTK pour effectuer une analyse de chaque tweet et le transformer en un ensemble de mots en suivant les différentes étapes de base du processus NLP (Natural Language Processing). Pour la documentation sur NLTK et les différentes phases du NLP. Utiliser l'algorithme K-Means pour classer les Tweets en k classes (vous pouvez essayer plusieurs valeurs de k allant de 3 à 30 par exemple).

- Après avoir récupéré les classes, choisissez un Tweet par classe comme représentant. Les Tweets choisis seront les résumés de toutes les informations contenues dans les Tweets.

3.5 Réalisation:

L'importation des différents bibliothèques :

```
[1]: #import the tweepy and pandas libraries:
import tweepy
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import re
import string
import nltk
import io
import seaborn as sns
import collections
```

```
[37]: # Consumer keys and access tokens, used for OAuth
consumer_key = 'gT0tUcUgaKid77h4wajeMAYMy'
consumer_secret = 'lPUcq66PIVChBs8NPEmai4T2dj2fUoHtvTEOsNEWGHMnosYGsu'
access_token = '1127537413553836039-oJYi1ETGHeEsiMyHsVCA78FUglToJ1'
access_token_secret = 'Javf8TtcaJL79VapHOPqxyErBtl8tTrDUhmuxfWSbiEcC'
```

```
[38]: # OAuth process, using the keys and tokens
auth = tweepy.OAuthHandler(consumer_key, consumer_secret)
auth.set_access_token(access_token, access_token_secret)
```

Création de l'interface proprement dite, en utilisant l'authentification

```
[39]: # Creation of the actual interface, using authentication
api = tweepy.API(auth, wait_on_rate_limit= True)
```

On va télécharger les Tweets à partir de Twitter en utilisant l'API de twitter. Pour cela, on doit obtenir un compte « Twitter Developer ».

```
[40]: posts = tweepy.Cursor(api.search,q="FootBall", lang = "en",count=10000).
      ↪items(12000)
data_analysis = pd.DataFrame(columns = ['Tweets'])
i=0
for tweet in posts:
    data_analysis.loc[i,"Tweets"] = tweet.text
    i+=1
```

```
[41]: data_analysis.shape
```

```
[41]: (12000, 1)
```

Maintenant on va sauvegarder ses tweets dans un fichier csv et les afficher

```
[42]: data_analysis.to_csv('data_analysis.csv',index = False)
      data_analysis.head(20)
```

```
[42]:
```

	Tweets
0	RT @AnnieHanson_: So proud of our OU Moms! ...
1	RT @MySportsUpdate: Football schedule coming u...
2	Five days to find out the cost of calling an i...
3	The Monett football team had four athletes sec...
4	Enter the #49ersFoundation Week 15 Gameday Swe...
5	@IrelandEmbUSA @MayoGAA Buffalo Bills are Amer...
6	@buddyfelch_24 @pattysheehan25 Nothing better ...
7	Football and pheasants once brought #Vikings t...
8	RT @Pinson_Football: Congrats to @QUEL2K on hi...
9	@KU_Football @Big12Conference Hope 82 comes ba...
10	@iamlesleyd @MiamiDolphins @5ReasonsSports @5r...
11	Before you lock in your DFS slots for tonight'...
12	@TreFourE @312Steez luck had like 5 4,000 yard...
13	College football signing day tracker 2021: Ful...
14	Used to play ballin like I'm Kobe before every...
15	Virginia Tech LT Darrisaw declares for draft h...
16	Would Pats Want Mariota? // The Guys Get Gifts...
17	Glad to work with @PhillipsWildca1 and @Philli...
18	Carthage has to have the best stretch of a pow...
19	@MalumWakho @SifisoNdlovu05 These people shoul...

```
[43]: data_analysis.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 12000 entries, 0 to 11999
Data columns (total 1 columns):
#   Column  Non-Null Count  Dtype
---  ---
0    Tweets  12000 non-null    object
dtypes: object(1)
memory usage: 507.5+ KB
```

3.6 1- Prétraitement des tweets :

Les tweets contiennent des objets inutiles tels que des hashtags, des mentions, des liens et des signes de ponctuation qui peuvent affecter les performances d'un algorithme et doivent donc être supprimés. Tous les textes sont convertis en minuscules pour éviter que les algorithmes n'interprètent les mêmes mots avec des cas différents comme différents.

```
[44]: #Clean the text
      #Create a function to clean the tweets
      def cleanText(text):
```

```

text = re.sub(r'@[A-Za-z0-9]+', '', text) #Removed @mentions
text = re.sub(r'RT[\s]+', '', text) #Removing RT
text = re.sub(r'https?:\/\/\S+', '', text) #Removing the hyper link

return text

#cleaning the text
data_analysis['clean Tweets']=data_analysis['Tweets'].apply(cleanText)
data_analysis.head(20)

```

[44]:

```

Tweets \
0 RT @AnnieHanson_: So proud of our OU Moms! ...
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```

clean Tweets
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2 Five days to find out the cost of calling an i...
3 The Monett football team had four athletes sec...
4 Enter the #49ersFoundation Week 15 Gameday Swe...
5 Buffalo Bills are American football version ...
6 _24 Nothing better than "football team" fans ...
7 Football and pheasants once brought #Vikings t...
8 _Football: Congrats to on his offer to play _...
9 _Football Hope 82 comes back. Big time tools ...
10 Lets talk football later.. but dang es...
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12 luck had like 5 4,000 yard seasons compared ...
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```

14 Used to play ballin like I'm Kobe before every...
15     Virginia Tech LT Darrisaw declares for draft
16 Would Pats Want Mariota? // The Guys Get Gifts...
17 Glad to work with and to put together a comp...
18 Carthage has to have the best stretch of a pow...
19     These people shouldn't be allowed to comment...

```

```

[45]: emoji_pattern = re.compile("[
                                u"\U0001F600-\U0001F64F"  # emoticons
                                u"\U0001F300-\U0001F5FF"  # symbols & pictographs
                                u"\U0001F680-\U0001F6FF"  # transport & map symbols
                                u"\U0001F1E0-\U0001F1FF"  # flags (iOS)
                                "]")
data_analysis['clean emoji']=data_analysis['clean Tweets'].str.
    ↪replace(r'[\x00-\x7F]+' , '', regex=True)
data_analysis.head(20)

```

```

[45]:                                     Tweets \
0    RT @AnnieHanson_: So proud of our OU Moms! ...
1    RT @MySportsUpdate: Football schedule coming u...
2    Five days to find out the cost of calling an i...
3    The Monett football team had four athletes sec...
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                                     clean Tweets \
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5    Buffalo Bills are American football version ...
6    _24 Nothing better than "football team" fans ...

```

```

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clean emoji

```

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```

```
[46]: string.punctuation
```

```
[46]: '!"#$%&\'()*+,-./:;<=>?@[\\]^_`{|}~'
```

```
[47]: def remove_punct(text):
    text = "".join([char for char in text if char not in string.punctuation])
    text = re.sub('[0-9]+', '', text)
    return text
data_analysis['Tweet_punct'] = data_analysis['clean emoji'].apply(lambda x:
    ↪remove_punct(x))
data_analysis.head(20)
```

[47]:

Tweets \

```
0 RT @AnnieHanson_: So proud of our OU Moms! ...
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```

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```

Tweet_punct

```

0  So proud of our OU Moms  \n\nThank you ladies...
1  Football schedule coming up \n\n games tomorr...
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5      Buffalo Bills are American football version ...
6      Nothing better than football team fans beati...
7  Football and pheasants once brought Vikings to...
8  Football Congrats to  on his offer to play foo...
9  Football Hope  comes back Big time tools if i...
10     Lets talk football later but dang espec...
11 Before you lock in your DFS slots for tonights...
12     luck had like  yard seasons compared to cam...
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```

Tokenisation et suppression des mots vides

```

[48]: def tokenization(text):
      text = re.split('\W+', text)
      return text

```



```
data_analysis['Tweet_tokenized'] = data_analysis['Tweet_punct'].apply(lambda x:
↳tokenization(x.lower()))
data_analysis.head(20)
```

[48]: Tweets \

```
0 RT @AnnieHanson_: So proud of our OU Moms! ...
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clean Tweets \

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18 Carthage has to have the best stretch of a pow...
19 These people shouldn't be allowed to comment...
```

```

                                clean emoji \
0  _: So proud of our OU Moms! \n\nThank you lad...
1  : Football schedule coming up: \n\n*2 games to...
2  Five days to find out the cost of calling an i...
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```

```

                                Tweet_punct \
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```

```

                                Tweet_tokenized
0  [, so, proud, of, our, ou, moms, thank, you, l...

```

```

1  [, football, schedule, coming, up, games, tomo...
2  [five, days, to, find, out, the, cost, of, cal...
3  [the, monett, football, team, had, four, athle...
4  [enter, the, ersfoundation, week, gameday, swe...
5  [, buffalo, bills, are, american, football, ve...
6  [, nothing, better, than, football, team, fans...
7  [football, and, pheasants, once, brought, viki...
8  [football, congrats, to, on, his, offer, to, p...
9  [football, hope, comes, back, big, time, tools...
10 [, lets, talk, football, later, but, dang, esp...
11 [before, you, lock, in, your, dfs, slots, for,...
12 [, luck, had, like, yard, seasons, compared, t...
13 [college, football, signing, day, tracker, ful...
14 [used, to, play, ballin, like, im, kobe, befor...
15 [virginia, tech, lt, darrisaw, declares, for, ...
16 [would, pats, want, mariota, the, guys, get, g...
17 [glad, to, work, with, and, to, put, together,...
18 [carthage, has, to, have, the, best, stretch, ...
19 [, these, people, shouldnt, be, allowed, to, c...

```

```
[49]: data_analysis['Tweet_tokenized'].to_csv('cleaning_data_analysis.csv',index =_
      ↪False)
```

```
[50]: #data_analysis.head(20)
```

3.7 2- Traitement des tweets : NLP (Natural LanguageProcessing):

On doit procéder à l'analyse du tweet en respectant les différentes étapes du NLP (Natural LanguageProcessing). La bibliothèque à utiliser est NLTK en Python.

```
[51]: nltk.download('stopwords' )
```

```
[nltk_data] Downloading package stopwords to /home/nabil/nltk_data...
[nltk_data] Package stopwords is already up-to-date!
```

```
[51]: True
```

```
[53]: #from nltk.corpus import stopwords
      #from nltk.tokenize import word_tokenize

      # word_tokenize accepts
      # a string as an input, not a file.
      #stop_words = set(stopwords.words('english'))
      #file1 = open("cleaning_data_analysis.csv")

      # Use this to read file content as a stream:
      #line = file1.read()
```

```

#words = line.split()
#for r in words:
#    if not r in stop_words:
#        appendFile = open('cleaning_data_analysis.csv','a')
#        appendFile.write(" "+r)
#        appendFile.close()
#print(stop_words)

```

```

{'s', "doesn't", 'down', 'during', 'over', "couldn't", "should've", 'only',
'my', 'those', 'on', 'will', 'against', 'these', 'won', 'who', 've', 'in',
'did', 'most', "wasn't", 'their', 'but', 'own', 'wouldn', 'she', 'the', 'is',
'into', 'while', 'o', 'aren', 'mightn', "haven't", "shan't", 'after', 'no',
"wouldn't", 'this', 'didn', 'couldn', 'between', 'and', 'haven', 'be', 'me',
'now', 'am', 'can', "shouldn't", 'of', 'by', 'don', "didn't", 'shan', 'any',
'we', "you'd", 'y', 'with', 'both', 'when', 'out', 'doing', 'because', 'being',
'at', 'ours', 't', 'yourselves', 'so', "hasn't", 'off', 'his', 'it', 'or',
'where', "needn't", 'if', 'to', 're', 'not', 'does', 'up', "mustn't", 'himself',
'shouldn', 'very', 'there', "it's", 'other', 'been', "you've", 'your', 'i',
'such', 'herself', 'nor', 'ma', "won't", 'our', 'just', 'you', "you're",
'further', 'as', 'doesn', 'again', 'theirs', 'needn', 'him', 'weren', 'its',
'itself', 'having', 'same', 'some', "hadn't", 'has', 'how', 'for', 'that',
"you'll", 'ain', "don't", 'what', "she's", 'were', 'here', 'myself', 'few',
'them', 'under', 'are', 'd', 'll', 'a', 'they', 'each', 'why', "weren't",
'should', 'have', 'her', 'about', "that'll", 'than', 'hasn', 'ourselves',
'above', 'too', 'was', 'before', "isn't", "mightn't", 'from', 'an', 'he',
'through', 'all', 'm', 'themselves', 'then', 'hers', 'below', 'wasn', 'until',
"aren't", 'yourself', 'more', 'mustn', 'whom', 'do', 'which', 'once', 'hadn',
'had', 'yours', 'isn'}

```

```

[54]: from nltk.stem.porter import PorterStemmer
from nltk.corpus import stopwords
ps = PorterStemmer()
stemmed_dataset=[]
for i in range(0,data_analysis.shape[0]):
    stemmed_array=data_analysis['Tweet_punct'][i].split()
    stemmed=[ps.stem(word) for word in stemmed_array if not word in_
→set(stopwords.words('english'))]
    stemmed=' '.join(stemmed)
    stemmed_dataset.append(stemmed)
print(stemmed_dataset[0:10])

```

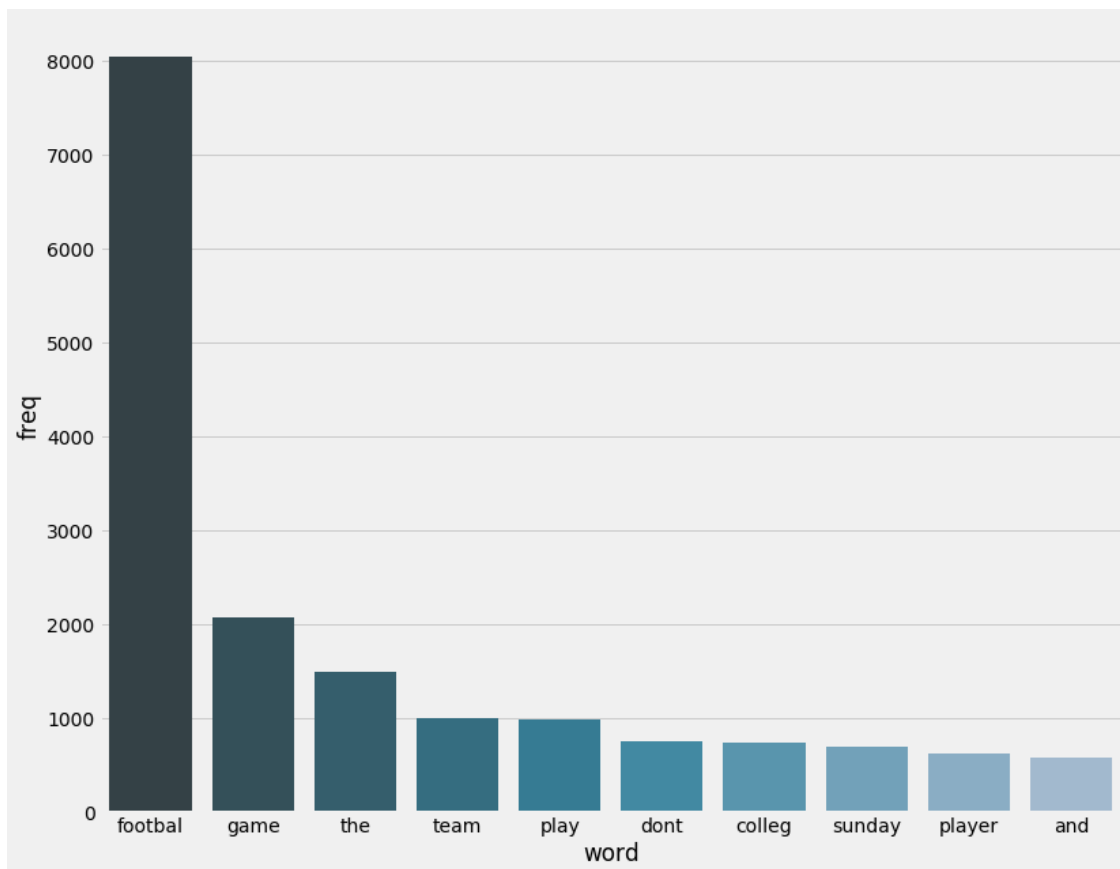
```

['So proud OU mom thank ladi rais amaz son give back local commun', 'football
schedul come game tomorrow night game earli window sunday game late window
sunday', 'five day find cost call illegitim titl amp illeg releg amp cost
scottish footba', 'the monett football team four athlet secur five spot
alldistrict football team', 'enter ersfound week gameday sweepstak present chanc
win john Ly', 'buffalo bill american football version mayo irish football team

```

honm Mayo', 'noth better football team fan beat chest lose record', 'football pheasant brought vike togeth iowa vikingschat', 'football congrat offer play football fearthespear pushon', 'football hope come back big time tool injuri free two hamilton kid']

```
[55]: from sklearn.feature_extraction.text import CountVectorizer
cv = CountVectorizer()
bow = cv.fit_transform(stemed_dataset)
word_freq = dict(zip(cv.get_feature_names(), np.asarray(bow.sum(axis=0)).
    ↪ravel()))
word_counter = collections.Counter(word_freq)
word_counter_df = pd.DataFrame(word_counter.most_common(10), columns = ['word',
    ↪'freq'])
fig, ax = plt.subplots(figsize=(12, 10))
sns.barplot(x="word", y="freq", data=word_counter_df, palette="PuBuGn_d", ax=ax)
plt.show();
```



```
[56]: #!pip install wordcloud
```

```
[57]: from wordcloud import WordCloud
plt.style.use('fivethirtyeight')
# Plot the word cloud
allWords = ' '.join([twts for twts in data_analysis['Tweet_punct']])
wordCloud = WordCloud(width = 500, height=300, random_state = 21,
    ↪max_font_size=119).generate(allWords)
#wordCloud=WordCloud(background_color='black',mode="RGB", width=2000 ,
    ↪height=1000).generate(allWords)
plt.imshow(wordCloud, interpolation = "bilinear")
plt.axis('off')
plt.show()
```



```
[58]: X=cv.fit_transform(stemed_dataset)
print(X)
```

(0, 8147)	1
(0, 7012)	1
(0, 6420)	1
(0, 5794)	1
(0, 8785)	1
(0, 4966)	1
(0, 7150)	1
(0, 330)	1
(0, 8198)	1
(0, 3629)	1
(0, 651)	1

(0, 5215)	1
(0, 1844)	1
(1, 3305)	1
(1, 7729)	1
(1, 1822)	1
(1, 3526)	3
(1, 8976)	1
(1, 6097)	1
(1, 2673)	1
(1, 9775)	2
(1, 8547)	2
(1, 5012)	1
(2, 3218)	1
(2, 2234)	1
:	:
(11997, 2320)	1
(11997, 1062)	1
(11997, 1292)	1
(11998, 3305)	1
(11998, 8917)	1
(11998, 6042)	1
(11998, 1752)	1
(11998, 6009)	1
(11998, 8842)	1
(11998, 9277)	1
(11998, 536)	1
(11998, 7712)	1
(11998, 1507)	1
(11998, 6214)	1
(11999, 5149)	1
(11999, 3591)	1
(11999, 2934)	1
(11999, 3725)	1
(11999, 8777)	1
(11999, 5341)	2
(11999, 7223)	1
(11999, 9088)	1
(11999, 8972)	1
(11999, 1125)	1
(11999, 9177)	1

3.8 3- Classification des tweets:

Etant donné un ensemble de tweets, l'objectif est de les résumer sous formes de groupes de sorte à ce que les Tweets qui sont dans le même groupe soient similaires. Ainsi, l'utilisateur pourra par la suite lire juste un Tweet de chaque groupe (le Tweet qui est le centroïde de groupes). * On va Utiliser l'algorithme K-Means pour classer les Tweets en 30 classes.

```
[64]: from sklearn.cluster import KMeans
      nb=[]
```

```
[65]: for i in range(1,30):
      ↵
      ↪Kmeans=KMeans(n_clusters=i,init='k-means++',max_iter=300,n_init=10,random_state=0,verbose=T
      Kmeans.fit(X)
      nb.append(Kmeans.inertia_)
```

```
Initialization complete
Iteration 0, inertia 271391.000
Iteration 1, inertia 129147.498
Converged at iteration 1: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 261125.000
Iteration 1, inertia 129147.498
Converged at iteration 1: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 261013.000
Iteration 1, inertia 129147.498
Converged at iteration 1: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 274093.000
Iteration 1, inertia 129147.498
Converged at iteration 1: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 274417.000
Iteration 1, inertia 129147.498
Converged at iteration 1: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 265265.000
Iteration 1, inertia 129147.498
Converged at iteration 1: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 235815.000
Iteration 1, inertia 129147.498
Converged at iteration 1: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 315735.000
Iteration 1, inertia 129147.498
```


Converged at iteration 1: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 255701.000
 Iteration 1, inertia 129147.498
 Converged at iteration 1: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 295001.000
 Iteration 1, inertia 129147.498
 Converged at iteration 1: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 240679.000
 Iteration 1, inertia 128167.979
 Iteration 2, inertia 128112.583
 Iteration 3, inertia 128106.517
 Iteration 4, inertia 128103.838
 Iteration 5, inertia 128095.284
 Iteration 6, inertia 128087.133
 Iteration 7, inertia 128085.082
 Iteration 8, inertia 128081.703
 Iteration 9, inertia 128081.642
 Iteration 10, inertia 128081.611
 Iteration 11, inertia 128081.598
 Converged at iteration 11: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 179041.000
 Iteration 1, inertia 129015.630
 Iteration 2, inertia 129012.653
 Iteration 3, inertia 129012.061
 Iteration 4, inertia 129010.583
 Iteration 5, inertia 129005.196
 Iteration 6, inertia 129005.041
 Converged at iteration 6: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 144595.000
 Iteration 1, inertia 129136.508
 Converged at iteration 1: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 196163.000
 Iteration 1, inertia 129128.436
 Converged at iteration 1: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete

```

Iteration 0, inertia 259208.000
Iteration 1, inertia 128764.419
Iteration 2, inertia 128740.116
Iteration 3, inertia 128723.586
Iteration 4, inertia 128688.761
Iteration 5, inertia 128245.585
Iteration 6, inertia 127859.641
Iteration 7, inertia 127417.780
Iteration 8, inertia 127037.779
Iteration 9, inertia 126916.010
Iteration 10, inertia 126905.629
Iteration 11, inertia 126903.947
Iteration 12, inertia 126903.787
Converged at iteration 12: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 216383.000
Iteration 1, inertia 128644.354
Iteration 2, inertia 127751.952
Iteration 3, inertia 127601.185
Iteration 4, inertia 127595.618
Iteration 5, inertia 127594.987
Iteration 6, inertia 127594.909
Iteration 7, inertia 127594.865
Iteration 8, inertia 127594.851
Iteration 9, inertia 127594.835
Converged at iteration 9: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 227903.000
Iteration 1, inertia 123374.744
Converged at iteration 1: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 265669.000
Iteration 1, inertia 128891.388
Iteration 2, inertia 128766.803
Iteration 3, inertia 128760.797
Converged at iteration 3: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 214751.000
Iteration 1, inertia 128863.315
Iteration 2, inertia 128262.550
Iteration 3, inertia 127883.612
Iteration 4, inertia 127825.946
Iteration 5, inertia 127792.628
Iteration 6, inertia 127791.728

```

Iteration 7, inertia 127791.685
 Iteration 8, inertia 127791.665
 Converged at iteration 8: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 214406.000
 Iteration 1, inertia 129133.675
 Converged at iteration 1: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 202929.000
 Iteration 1, inertia 128124.619
 Iteration 2, inertia 126163.363
 Iteration 3, inertia 125350.869
 Iteration 4, inertia 125329.840
 Iteration 5, inertia 125328.972
 Iteration 6, inertia 125328.723
 Iteration 7, inertia 125328.599
 Converged at iteration 7: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 178665.000
 Iteration 1, inertia 127169.342
 Iteration 2, inertia 126873.865
 Iteration 3, inertia 126774.133
 Iteration 4, inertia 126767.881
 Iteration 5, inertia 126761.842
 Iteration 6, inertia 126761.686
 Converged at iteration 6: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 144563.000
 Iteration 1, inertia 129086.019
 Iteration 2, inertia 129054.658
 Iteration 3, inertia 128985.581
 Iteration 4, inertia 128984.219
 Converged at iteration 4: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 195576.000
 Iteration 1, inertia 128734.658
 Iteration 2, inertia 128518.995
 Iteration 3, inertia 128189.474
 Iteration 4, inertia 128086.822
 Iteration 5, inertia 128083.940
 Iteration 6, inertia 128082.040
 Iteration 7, inertia 128082.018
 Converged at iteration 7: center shift 0.000000e+00 within tolerance

```

1.071728e-07
Initialization complete
Iteration 0, inertia 214711.000
Iteration 1, inertia 128771.425
Iteration 2, inertia 128748.859
Iteration 3, inertia 128729.374
Iteration 4, inertia 128722.863
Iteration 5, inertia 128713.201
Iteration 6, inertia 128693.013
Iteration 7, inertia 128669.187
Converged at iteration 7: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 164944.000
Iteration 1, inertia 128927.739
Iteration 2, inertia 128874.251
Iteration 3, inertia 128739.323
Iteration 4, inertia 128598.492
Iteration 5, inertia 128535.194
Iteration 6, inertia 128422.501
Iteration 7, inertia 128421.848
Converged at iteration 7: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 176840.000
Iteration 1, inertia 128469.284
Iteration 2, inertia 128341.156
Iteration 3, inertia 127923.414
Iteration 4, inertia 127797.629
Iteration 5, inertia 127631.340
Iteration 6, inertia 127577.639
Iteration 7, inertia 127556.365
Iteration 8, inertia 127554.523
Iteration 9, inertia 127554.502
Converged at iteration 9: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 218033.000
Iteration 1, inertia 123355.657
Iteration 2, inertia 123355.566
Converged at iteration 2: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 212631.000
Iteration 1, inertia 126097.348
Iteration 2, inertia 124397.219
Iteration 3, inertia 121832.642
Iteration 4, inertia 120742.884

```

```

Iteration 5, inertia 120721.154
Iteration 6, inertia 120716.587
Iteration 7, inertia 120716.053
Iteration 8, inertia 120716.003
Iteration 9, inertia 120715.998
Converged at iteration 9: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 178394.000
Iteration 1, inertia 128891.204
Iteration 2, inertia 128888.786
Iteration 3, inertia 128888.135
Converged at iteration 3: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 195283.000
Iteration 1, inertia 122400.665
Iteration 2, inertia 120820.130
Iteration 3, inertia 119697.183
Iteration 4, inertia 119676.923
Iteration 5, inertia 119675.617
Iteration 6, inertia 119673.202
Iteration 7, inertia 119672.892
Converged at iteration 7: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 178004.000
Iteration 1, inertia 126712.011
Iteration 2, inertia 126412.642
Iteration 3, inertia 126315.180
Iteration 4, inertia 126308.934
Iteration 5, inertia 126302.892
Iteration 6, inertia 126302.737
Converged at iteration 6: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 144365.000
Iteration 1, inertia 128905.152
Iteration 2, inertia 128873.786
Iteration 3, inertia 128804.703
Iteration 4, inertia 128803.340
Converged at iteration 4: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 187330.000
Iteration 1, inertia 125558.238
Iteration 2, inertia 125549.938
Iteration 3, inertia 125549.849

```

Converged at iteration 3: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 213543.000
 Iteration 1, inertia 128268.146
 Iteration 2, inertia 128119.215
 Iteration 3, inertia 126754.552
 Iteration 4, inertia 125505.640
 Iteration 5, inertia 125476.186
 Iteration 6, inertia 125461.599
 Iteration 7, inertia 125439.741
 Converged at iteration 7: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 164532.000
 Iteration 1, inertia 128590.904
 Iteration 2, inertia 128526.675
 Iteration 3, inertia 128384.678
 Iteration 4, inertia 128258.638
 Iteration 5, inertia 128203.501
 Iteration 6, inertia 128077.585
 Iteration 7, inertia 128076.187
 Converged at iteration 7: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 176654.000
 Iteration 1, inertia 128350.357
 Iteration 2, inertia 128222.047
 Iteration 3, inertia 127804.467
 Iteration 4, inertia 127679.354
 Iteration 5, inertia 127513.263
 Iteration 6, inertia 127459.022
 Iteration 7, inertia 127436.560
 Iteration 8, inertia 127435.850
 Converged at iteration 8: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 214059.000
 Iteration 1, inertia 121121.396
 Iteration 2, inertia 121110.545
 Iteration 3, inertia 121107.804
 Iteration 4, inertia 121106.576
 Iteration 5, inertia 121106.524
 Converged at iteration 5: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 212507.000
 Iteration 1, inertia 126033.381

```

Iteration 2, inertia 124257.795
Iteration 3, inertia 121670.782
Iteration 4, inertia 120575.438
Iteration 5, inertia 120476.409
Iteration 6, inertia 120291.252
Iteration 7, inertia 120272.909
Iteration 8, inertia 120255.994
Iteration 9, inertia 120186.131
Iteration 10, inertia 119910.525
Iteration 11, inertia 119767.708
Iteration 12, inertia 119737.014
Iteration 13, inertia 119736.986
Converged at iteration 13: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 178132.000
Iteration 1, inertia 128717.877
Iteration 2, inertia 128715.458
Iteration 3, inertia 128714.807
Converged at iteration 3: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 193863.000
Iteration 1, inertia 122080.366
Iteration 2, inertia 120810.099
Iteration 3, inertia 119446.896
Iteration 4, inertia 119389.959
Iteration 5, inertia 119343.091
Iteration 6, inertia 119312.354
Converged at iteration 6: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 176345.000
Iteration 1, inertia 125750.634
Iteration 2, inertia 125394.587
Iteration 3, inertia 125388.259
Iteration 4, inertia 125387.305
Converged at iteration 4: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 144343.000
Iteration 1, inertia 128837.288
Iteration 2, inertia 128797.913
Iteration 3, inertia 128720.051
Iteration 4, inertia 128718.689
Converged at iteration 4: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete

```

```

Iteration 0, inertia 187194.000
Iteration 1, inertia 125462.864
Iteration 2, inertia 125454.554
Iteration 3, inertia 125454.465
Converged at iteration 3: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 203991.000
Iteration 1, inertia 125346.150
Iteration 2, inertia 125181.908
Iteration 3, inertia 125161.669
Iteration 4, inertia 125138.951
Iteration 5, inertia 125138.748
Converged at iteration 5: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 157680.000
Iteration 1, inertia 122823.290
Iteration 2, inertia 122630.383
Iteration 3, inertia 122463.399
Iteration 4, inertia 122397.546
Iteration 5, inertia 122308.669
Iteration 6, inertia 122308.472
Converged at iteration 6: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 172807.000
Iteration 1, inertia 125320.039
Iteration 2, inertia 125098.086
Iteration 3, inertia 124959.326
Iteration 4, inertia 124884.605
Converged at iteration 4: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 194690.000
Iteration 1, inertia 120575.827
Iteration 2, inertia 120216.521
Iteration 3, inertia 119792.309
Iteration 4, inertia 118600.368
Iteration 5, inertia 118198.228
Iteration 6, inertia 118191.875
Converged at iteration 6: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 202731.000
Iteration 1, inertia 120785.123
Iteration 2, inertia 120162.564
Iteration 3, inertia 119865.828

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Iteration 4, inertia 119659.011
Iteration 5, inertia 119504.756
Iteration 6, inertia 119385.557
Iteration 7, inertia 119012.190
Iteration 8, inertia 118795.814
Iteration 9, inertia 118714.395
Iteration 10, inertia 118713.146
Converged at iteration 10: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 178037.000
Iteration 1, inertia 128641.017
Iteration 2, inertia 128638.602
Iteration 3, inertia 128637.951
Converged at iteration 3: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 193635.000
Iteration 1, inertia 121329.906
Iteration 2, inertia 119316.795
Iteration 3, inertia 118013.641
Iteration 4, inertia 117937.096
Iteration 5, inertia 117732.230
Iteration 6, inertia 117383.145
Iteration 7, inertia 117159.315
Iteration 8, inertia 117113.071
Iteration 9, inertia 117110.693
Converged at iteration 9: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 168137.000
Iteration 1, inertia 118744.041
Iteration 2, inertia 118411.388
Iteration 3, inertia 118385.168
Iteration 4, inertia 118384.211
Iteration 5, inertia 118378.648
Iteration 6, inertia 118378.483
Converged at iteration 6: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 142102.000
Iteration 1, inertia 126594.232
Iteration 2, inertia 126567.049
Iteration 3, inertia 126485.502
Iteration 4, inertia 126475.129
Converged at iteration 4: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete

```

```

Iteration 0, inertia 187158.000
Iteration 1, inertia 125426.179
Iteration 2, inertia 125417.868
Iteration 3, inertia 125417.780
Converged at iteration 3: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 203045.000
Iteration 1, inertia 123263.470
Iteration 2, inertia 122979.962
Iteration 3, inertia 122951.189
Iteration 4, inertia 122927.726
Converged at iteration 4: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 157618.000
Iteration 1, inertia 122734.450
Iteration 2, inertia 122541.636
Iteration 3, inertia 122374.618
Iteration 4, inertia 122308.657
Iteration 5, inertia 122219.769
Iteration 6, inertia 122219.572
Converged at iteration 6: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 165690.000
Iteration 1, inertia 119666.082
Iteration 2, inertia 119427.809
Iteration 3, inertia 119300.015
Iteration 4, inertia 119228.088
Converged at iteration 4: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 193861.000
Iteration 1, inertia 120020.442
Iteration 2, inertia 119672.651
Iteration 3, inertia 119282.818
Iteration 4, inertia 118111.536
Iteration 5, inertia 117657.206
Iteration 6, inertia 117649.532
Converged at iteration 6: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 201978.000
Iteration 1, inertia 120346.968
Iteration 2, inertia 119714.054
Iteration 3, inertia 119419.355
Iteration 4, inertia 119211.007

```

```

Iteration 5, inertia 119055.623
Iteration 6, inertia 118936.808
Iteration 7, inertia 118563.324
Iteration 8, inertia 118347.354
Iteration 9, inertia 118267.150
Iteration 10, inertia 118264.550
Converged at iteration 10: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 165706.000
Iteration 1, inertia 127649.760
Iteration 2, inertia 127630.686
Iteration 3, inertia 127602.257
Iteration 4, inertia 127601.928
Iteration 5, inertia 127600.815
Iteration 6, inertia 127600.133
Iteration 7, inertia 127599.923
Converged at iteration 7: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 191526.000
Iteration 1, inertia 118556.209
Iteration 2, inertia 113462.050
Iteration 3, inertia 111170.977
Iteration 4, inertia 110982.194
Iteration 5, inertia 110608.192
Iteration 6, inertia 110329.310
Iteration 7, inertia 110270.389
Iteration 8, inertia 110265.853
Converged at iteration 8: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 167695.000
Iteration 1, inertia 118466.051
Iteration 2, inertia 118113.570
Iteration 3, inertia 118080.461
Iteration 4, inertia 118060.282
Iteration 5, inertia 118053.439
Iteration 6, inertia 118053.164
Converged at iteration 6: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 142064.000
Iteration 1, inertia 126548.412
Iteration 2, inertia 126521.220
Iteration 3, inertia 126439.675
Iteration 4, inertia 126429.302
Converged at iteration 4: center shift 0.000000e+00 within tolerance

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1.071728e-07
Initialization complete
Iteration 0, inertia 186493.000
Iteration 1, inertia 124995.390
Iteration 2, inertia 124980.365
Iteration 3, inertia 124980.276
Converged at iteration 3: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 176568.000
Iteration 1, inertia 126381.741
Iteration 2, inertia 123169.670
Iteration 3, inertia 122781.039
Iteration 4, inertia 122673.390
Iteration 5, inertia 122349.954
Iteration 6, inertia 122159.456
Iteration 7, inertia 122146.707
Iteration 8, inertia 122133.240
Iteration 9, inertia 122114.752
Iteration 10, inertia 122114.590
Converged at iteration 10: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 154911.000
Iteration 1, inertia 120488.086
Iteration 2, inertia 120296.951
Iteration 3, inertia 120130.753
Iteration 4, inertia 120081.021
Iteration 5, inertia 119975.201
Iteration 6, inertia 119974.489
Converged at iteration 6: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 157482.000
Iteration 1, inertia 112810.712
Iteration 2, inertia 112607.484
Iteration 3, inertia 112468.066
Iteration 4, inertia 112395.716
Converged at iteration 4: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 192711.000
Iteration 1, inertia 119302.897
Iteration 2, inertia 118950.993
Iteration 3, inertia 118529.925
Iteration 4, inertia 117309.369
Iteration 5, inertia 116948.497
Iteration 6, inertia 116941.364

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Converged at iteration 6: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 168100.000
Iteration 1, inertia 121145.080
Iteration 2, inertia 120910.814
Iteration 3, inertia 120839.504
Iteration 4, inertia 120835.075
Iteration 5, inertia 120833.760
Iteration 6, inertia 120818.416
Iteration 7, inertia 120803.859
Iteration 8, inertia 120765.981
Iteration 9, inertia 120764.008
Iteration 10, inertia 120762.774
Converged at iteration 10: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 165553.000
Iteration 1, inertia 127525.151
Iteration 2, inertia 127506.137
Iteration 3, inertia 127477.706
Iteration 4, inertia 127477.375
Iteration 5, inertia 127476.263
Iteration 6, inertia 127475.371
Converged at iteration 6: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 155629.000
Iteration 1, inertia 118363.613
Iteration 2, inertia 118331.152
Iteration 3, inertia 118305.283
Iteration 4, inertia 118290.029
Iteration 5, inertia 118222.122
Iteration 6, inertia 118065.124
Iteration 7, inertia 118064.481
Converged at iteration 7: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 168003.000
Iteration 1, inertia 112999.811
Iteration 2, inertia 112527.378
Iteration 3, inertia 112428.072
Iteration 4, inertia 112422.592
Iteration 5, inertia 112416.252
Iteration 6, inertia 112416.073
Iteration 7, inertia 112415.849
Converged at iteration 7: center shift 0.000000e+00 within tolerance
1.071728e-07

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Initialization complete
Iteration 0, inertia 127839.000
Iteration 1, inertia 113479.149
Iteration 2, inertia 113278.722
Iteration 3, inertia 113063.726
Iteration 4, inertia 113060.229
Iteration 5, inertia 113060.120
Converged at iteration 5: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 139517.000
Iteration 1, inertia 115957.221
Iteration 2, inertia 115803.809
Iteration 3, inertia 115691.987
Iteration 4, inertia 115561.094
Iteration 5, inertia 115532.088
Iteration 6, inertia 115519.190
Iteration 7, inertia 115518.545
Iteration 8, inertia 115517.741
Iteration 9, inertia 115515.595
Iteration 10, inertia 115515.472
Iteration 11, inertia 115515.020
Iteration 12, inertia 115514.985
Converged at iteration 12: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 164070.000
Iteration 1, inertia 118260.741
Iteration 2, inertia 118108.881
Iteration 3, inertia 118008.470
Iteration 4, inertia 117975.052
Iteration 5, inertia 117972.403
Converged at iteration 5: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 147174.000
Iteration 1, inertia 113462.804
Iteration 2, inertia 113143.025
Iteration 3, inertia 112898.080
Iteration 4, inertia 112839.853
Iteration 5, inertia 112805.185
Iteration 6, inertia 112711.646
Iteration 7, inertia 112710.471
Iteration 8, inertia 112710.286
Iteration 9, inertia 112710.191
Iteration 10, inertia 112710.164
Iteration 11, inertia 112710.134
Iteration 12, inertia 112710.108

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Converged at iteration 12: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 162559.000
Iteration 1, inertia 117035.813
Iteration 2, inertia 116804.491
Iteration 3, inertia 116689.021
Iteration 4, inertia 116580.998
Converged at iteration 4: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 144852.000
Iteration 1, inertia 119801.592
Iteration 2, inertia 119792.531
Converged at iteration 2: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 157683.000
Iteration 1, inertia 113291.346
Iteration 2, inertia 112711.179
Iteration 3, inertia 112334.205
Iteration 4, inertia 112258.784
Iteration 5, inertia 112252.548
Iteration 6, inertia 112247.898
Iteration 7, inertia 112242.429
Iteration 8, inertia 112241.793
Iteration 9, inertia 112239.522
Iteration 10, inertia 112238.480
Iteration 11, inertia 112225.850
Iteration 12, inertia 112219.009
Iteration 13, inertia 112213.808
Iteration 14, inertia 112212.443
Iteration 15, inertia 112211.498
Iteration 16, inertia 112210.863
Iteration 17, inertia 112207.178
Iteration 18, inertia 112196.994
Iteration 19, inertia 112194.317
Iteration 20, inertia 112194.164
Converged at iteration 20: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 165887.000
Iteration 1, inertia 118429.479
Iteration 2, inertia 118420.415
Iteration 3, inertia 118417.898
Iteration 4, inertia 118417.673
Converged at iteration 4: center shift 0.000000e+00 within tolerance
1.071728e-07

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Initialization complete
Iteration 0, inertia 154829.000
Iteration 1, inertia 111586.422
Iteration 2, inertia 111286.115
Iteration 3, inertia 111269.407
Iteration 4, inertia 111246.386
Iteration 5, inertia 111217.058
Iteration 6, inertia 111033.460
Iteration 7, inertia 111030.368
Converged at iteration 7: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 167523.000
Iteration 1, inertia 112617.868
Iteration 2, inertia 112145.380
Iteration 3, inertia 112046.063
Iteration 4, inertia 112040.567
Iteration 5, inertia 112034.228
Iteration 6, inertia 112034.050
Iteration 7, inertia 112033.826
Converged at iteration 7: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 127791.000
Iteration 1, inertia 113435.489
Iteration 2, inertia 113235.184
Iteration 3, inertia 113020.188
Iteration 4, inertia 113016.691
Iteration 5, inertia 113016.582
Converged at iteration 5: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 139037.000
Iteration 1, inertia 115539.534
Iteration 2, inertia 115386.405
Iteration 3, inertia 115275.472
Iteration 4, inertia 115137.005
Iteration 5, inertia 115105.934
Iteration 6, inertia 115101.455
Iteration 7, inertia 115100.504
Iteration 8, inertia 115098.178
Iteration 9, inertia 115097.917
Iteration 10, inertia 115097.465
Iteration 11, inertia 115097.430
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 160239.000

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Iteration 1, inertia 118042.400
Iteration 2, inertia 117794.674
Iteration 3, inertia 117691.869
Iteration 4, inertia 117669.457
Iteration 5, inertia 117659.553
Iteration 6, inertia 117639.045
Iteration 7, inertia 117631.010
Iteration 8, inertia 117630.904
Converged at iteration 8: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 147099.000
Iteration 1, inertia 113405.535
Iteration 2, inertia 113085.832
Iteration 3, inertia 112841.298
Iteration 4, inertia 112783.507
Iteration 5, inertia 112753.629
Iteration 6, inertia 112655.015
Iteration 7, inertia 112653.240
Iteration 8, inertia 112653.102
Iteration 9, inertia 112653.008
Iteration 10, inertia 112652.980
Iteration 11, inertia 112652.949
Iteration 12, inertia 112652.924
Converged at iteration 12: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 161947.000
Iteration 1, inertia 116812.727
Iteration 2, inertia 116527.580
Iteration 3, inertia 116390.910
Iteration 4, inertia 116309.199
Converged at iteration 4: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 144562.000
Iteration 1, inertia 119578.386
Iteration 2, inertia 119569.315
Converged at iteration 2: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 157591.000
Iteration 1, inertia 113219.653
Iteration 2, inertia 112639.446
Iteration 3, inertia 112262.468
Iteration 4, inertia 112187.034
Iteration 5, inertia 112180.811
Iteration 6, inertia 112176.159

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Iteration 7, inertia 112170.689
Iteration 8, inertia 112170.063
Iteration 9, inertia 112167.792
Iteration 10, inertia 112166.749
Iteration 11, inertia 112154.119
Iteration 12, inertia 112147.278
Iteration 13, inertia 112142.077
Iteration 14, inertia 112140.712
Iteration 15, inertia 112139.767
Iteration 16, inertia 112139.132
Iteration 17, inertia 112135.447
Iteration 18, inertia 112125.263
Iteration 19, inertia 112122.586
Iteration 20, inertia 112122.434
Converged at iteration 20: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 164139.000
Iteration 1, inertia 117680.570
Iteration 2, inertia 117575.944
Iteration 3, inertia 117480.008
Iteration 4, inertia 117409.693
Iteration 5, inertia 117404.934
Converged at iteration 5: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 146621.000
Iteration 1, inertia 111037.598
Iteration 2, inertia 111000.182
Iteration 3, inertia 110982.653
Iteration 4, inertia 110940.007
Iteration 5, inertia 110564.671
Iteration 6, inertia 110182.611
Iteration 7, inertia 110172.860
Iteration 8, inertia 110172.585
Converged at iteration 8: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 167455.000
Iteration 1, inertia 112469.329
Iteration 2, inertia 111993.448
Iteration 3, inertia 111894.127
Iteration 4, inertia 111888.627
Iteration 5, inertia 111882.289
Iteration 6, inertia 111882.059
Iteration 7, inertia 111881.835
Converged at iteration 7: center shift 0.000000e+00 within tolerance
1.071728e-07

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Initialization complete
Iteration 0, inertia 127741.000
Iteration 1, inertia 113290.049
Iteration 2, inertia 113089.794
Iteration 3, inertia 112878.997
Iteration 4, inertia 112875.470
Iteration 5, inertia 112875.361
Converged at iteration 5: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 138917.000
Iteration 1, inertia 115407.227
Iteration 2, inertia 115252.535
Iteration 3, inertia 115146.109
Iteration 4, inertia 115004.738
Iteration 5, inertia 114973.982
Iteration 6, inertia 114967.865
Iteration 7, inertia 114966.691
Iteration 8, inertia 114964.188
Iteration 9, inertia 114964.034
Iteration 10, inertia 114963.996
Converged at iteration 10: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 160089.000
Iteration 1, inertia 117887.902
Iteration 2, inertia 117623.409
Iteration 3, inertia 117479.616
Iteration 4, inertia 117382.276
Iteration 5, inertia 117351.432
Iteration 6, inertia 117342.086
Iteration 7, inertia 117323.271
Iteration 8, inertia 117321.847
Iteration 9, inertia 117321.814
Converged at iteration 9: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 146839.000
Iteration 1, inertia 112832.515
Iteration 2, inertia 112487.578
Iteration 3, inertia 112236.329
Iteration 4, inertia 112178.466
Iteration 5, inertia 112149.522
Iteration 6, inertia 112050.876
Iteration 7, inertia 112049.081
Iteration 8, inertia 112048.935
Iteration 9, inertia 112048.803
Iteration 10, inertia 112048.746

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Converged at iteration 10: center shift 0.000000e+00 within tolerance
1.071728e-07

Initialization complete

Iteration 0, inertia 161647.000
Iteration 1, inertia 116604.970
Iteration 2, inertia 115860.127
Iteration 3, inertia 115621.983
Iteration 4, inertia 115533.056
Iteration 5, inertia 115533.032

Converged at iteration 5: center shift 0.000000e+00 within tolerance
1.071728e-07

Initialization complete

Iteration 0, inertia 143587.000
Iteration 1, inertia 117494.349
Iteration 2, inertia 117363.680
Iteration 3, inertia 117363.325

Converged at iteration 3: center shift 0.000000e+00 within tolerance
1.071728e-07

Initialization complete

Iteration 0, inertia 156517.000
Iteration 1, inertia 112680.398
Iteration 2, inertia 112025.537
Iteration 3, inertia 111653.606
Iteration 4, inertia 111570.511
Iteration 5, inertia 111563.834
Iteration 6, inertia 111559.427
Iteration 7, inertia 111553.672
Iteration 8, inertia 111553.048
Iteration 9, inertia 111550.764
Iteration 10, inertia 111549.744
Iteration 11, inertia 111537.003
Iteration 12, inertia 111531.418
Iteration 13, inertia 111526.383
Iteration 14, inertia 111524.412
Iteration 15, inertia 111523.447
Iteration 16, inertia 111519.551
Iteration 17, inertia 111510.135
Iteration 18, inertia 111506.919
Iteration 19, inertia 111506.765

Converged at iteration 19: center shift 0.000000e+00 within tolerance
1.071728e-07

Initialization complete

Iteration 0, inertia 162831.000
Iteration 1, inertia 117204.711
Iteration 2, inertia 117099.081
Iteration 3, inertia 117005.194
Iteration 4, inertia 116933.929
Iteration 5, inertia 116929.170

Converged at iteration 5: center shift 0.000000e+00 within tolerance
1.071728e-07

Initialization complete

Iteration 0, inertia 146516.000
Iteration 1, inertia 110954.888
Iteration 2, inertia 110917.468
Iteration 3, inertia 110899.942
Iteration 4, inertia 110857.284
Iteration 5, inertia 110482.042
Iteration 6, inertia 110099.998
Iteration 7, inertia 110090.247
Iteration 8, inertia 110089.972

Converged at iteration 8: center shift 0.000000e+00 within tolerance
1.071728e-07

Initialization complete

Iteration 0, inertia 166162.000
Iteration 1, inertia 111527.122
Iteration 2, inertia 111047.687
Iteration 3, inertia 110997.582
Iteration 4, inertia 110995.676

Converged at iteration 4: center shift 0.000000e+00 within tolerance
1.071728e-07

Initialization complete

Iteration 0, inertia 127293.000
Iteration 1, inertia 112872.309
Iteration 2, inertia 112671.722
Iteration 3, inertia 112460.949
Iteration 4, inertia 112457.212
Iteration 5, inertia 112457.102

Converged at iteration 5: center shift 0.000000e+00 within tolerance
1.071728e-07

Initialization complete

Iteration 0, inertia 138077.000
Iteration 1, inertia 114688.455
Iteration 2, inertia 114520.442
Iteration 3, inertia 114306.406
Iteration 4, inertia 114268.834
Iteration 5, inertia 114249.810
Iteration 6, inertia 114248.447
Iteration 7, inertia 114245.953
Iteration 8, inertia 114245.609
Iteration 9, inertia 114245.516
Iteration 10, inertia 114245.478

Converged at iteration 10: center shift 0.000000e+00 within tolerance
1.071728e-07

Initialization complete

Iteration 0, inertia 159837.000
Iteration 1, inertia 117672.154

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Iteration 2, inertia 117407.514
Iteration 3, inertia 117263.735
Iteration 4, inertia 117166.404
Iteration 5, inertia 117135.559
Iteration 6, inertia 117126.210
Iteration 7, inertia 117107.395
Iteration 8, inertia 117105.970
Iteration 9, inertia 117105.938
Converged at iteration 9: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 146583.000
Iteration 1, inertia 112634.516
Iteration 2, inertia 112289.586
Iteration 3, inertia 112037.655
Iteration 4, inertia 111980.235
Iteration 5, inertia 111951.537
Iteration 6, inertia 111852.888
Iteration 7, inertia 111851.090
Iteration 8, inertia 111850.943
Iteration 9, inertia 111850.811
Iteration 10, inertia 111850.755
Converged at iteration 10: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 161368.000
Iteration 1, inertia 116449.603
Iteration 2, inertia 115668.947
Iteration 3, inertia 115424.820
Iteration 4, inertia 115330.199
Iteration 5, inertia 115326.491
Converged at iteration 5: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 143495.000
Iteration 1, inertia 117406.206
Iteration 2, inertia 117248.099
Iteration 3, inertia 117201.178
Converged at iteration 3: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 156286.000
Iteration 1, inertia 112466.813
Iteration 2, inertia 111811.276
Iteration 3, inertia 111439.439
Iteration 4, inertia 111356.123
Iteration 5, inertia 111349.448
Iteration 6, inertia 111345.043

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Iteration 7, inertia 111339.285
Iteration 8, inertia 111338.666
Iteration 9, inertia 111336.384
Iteration 10, inertia 111335.379
Iteration 11, inertia 111322.649
Iteration 12, inertia 111317.073
Iteration 13, inertia 111312.039
Iteration 14, inertia 111310.067
Iteration 15, inertia 111309.103
Iteration 16, inertia 111305.228
Iteration 17, inertia 111295.820
Iteration 18, inertia 111292.608
Iteration 19, inertia 111292.454
Converged at iteration 19: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 162735.000
Iteration 1, inertia 117132.225
Iteration 2, inertia 117026.598
Iteration 3, inertia 116932.748
Iteration 4, inertia 116861.507
Iteration 5, inertia 116856.748
Converged at iteration 5: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 142704.000
Iteration 1, inertia 108350.630
Iteration 2, inertia 108298.436
Iteration 3, inertia 108292.653
Iteration 4, inertia 108290.906
Iteration 5, inertia 108290.187
Iteration 6, inertia 108284.515
Iteration 7, inertia 108268.134
Iteration 8, inertia 108265.477
Iteration 9, inertia 108264.846
Iteration 10, inertia 108264.572
Iteration 11, inertia 108264.063
Iteration 12, inertia 108260.904
Iteration 13, inertia 108173.708
Iteration 14, inertia 108151.127
Iteration 15, inertia 108150.142
Converged at iteration 15: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 165898.000
Iteration 1, inertia 111313.970
Iteration 2, inertia 110830.962
Iteration 3, inertia 110785.210

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Iteration 4, inertia 110783.328
Converged at iteration 4: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 127095.000
Iteration 1, inertia 112692.102
Iteration 2, inertia 112491.748
Iteration 3, inertia 112280.968
Iteration 4, inertia 112277.231
Iteration 5, inertia 112277.122
Converged at iteration 5: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 138029.000
Iteration 1, inertia 114577.677
Iteration 2, inertia 114364.186
Iteration 3, inertia 114250.405
Iteration 4, inertia 114106.872
Iteration 5, inertia 114074.855
Iteration 6, inertia 114070.877
Iteration 7, inertia 114067.572
Iteration 8, inertia 114067.271
Iteration 9, inertia 114067.128
Iteration 10, inertia 114067.091
Converged at iteration 10: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 158291.000
Iteration 1, inertia 116916.774
Iteration 2, inertia 116660.532
Iteration 3, inertia 116527.533
Iteration 4, inertia 116443.190
Iteration 5, inertia 116407.625
Iteration 6, inertia 116407.423
Iteration 7, inertia 116407.339
Converged at iteration 7: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 146207.000
Iteration 1, inertia 112375.614
Iteration 2, inertia 112030.558
Iteration 3, inertia 111778.629
Iteration 4, inertia 111720.940
Iteration 5, inertia 111692.632
Iteration 6, inertia 111593.727
Iteration 7, inertia 111591.766
Iteration 8, inertia 111591.624
Iteration 9, inertia 111591.493

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Iteration 10, inertia 111591.436
 Converged at iteration 10: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 160888.000
 Iteration 1, inertia 116068.596
 Iteration 2, inertia 115286.789
 Iteration 3, inertia 115043.360
 Iteration 4, inertia 114949.028
 Iteration 5, inertia 114945.321
 Converged at iteration 5: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 135287.000
 Iteration 1, inertia 110545.122
 Iteration 2, inertia 110385.846
 Iteration 3, inertia 110338.920
 Converged at iteration 3: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 156201.000
 Iteration 1, inertia 112402.211
 Iteration 2, inertia 111746.639
 Iteration 3, inertia 111374.802
 Iteration 4, inertia 111291.482
 Iteration 5, inertia 111284.806
 Iteration 6, inertia 111280.401
 Iteration 7, inertia 111274.644
 Iteration 8, inertia 111274.025
 Iteration 9, inertia 111271.743
 Iteration 10, inertia 111270.737
 Iteration 11, inertia 111258.008
 Iteration 12, inertia 111252.432
 Iteration 13, inertia 111247.397
 Iteration 14, inertia 111245.425
 Iteration 15, inertia 111244.461
 Iteration 16, inertia 111240.586
 Iteration 17, inertia 111231.179
 Iteration 18, inertia 111227.967
 Iteration 19, inertia 111227.813
 Converged at iteration 19: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 162703.000
 Iteration 1, inertia 117107.914
 Iteration 2, inertia 117002.974
 Iteration 3, inertia 116919.963
 Iteration 4, inertia 116893.948

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Iteration 5, inertia 116890.306
Iteration 6, inertia 116889.657
Iteration 7, inertia 116885.567
Iteration 8, inertia 116867.806
Iteration 9, inertia 116854.939
Iteration 10, inertia 116832.972
Converged at iteration 10: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 142607.000
Iteration 1, inertia 108273.629
Iteration 2, inertia 108217.096
Iteration 3, inertia 108185.549
Iteration 4, inertia 108150.775
Iteration 5, inertia 108119.761
Iteration 6, inertia 108105.832
Iteration 7, inertia 108086.876
Iteration 8, inertia 108081.831
Iteration 9, inertia 108078.463
Iteration 10, inertia 108076.852
Iteration 11, inertia 108075.331
Iteration 12, inertia 108070.805
Iteration 13, inertia 107981.887
Iteration 14, inertia 107961.545
Iteration 15, inertia 107961.372
Converged at iteration 15: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 165284.000
Iteration 1, inertia 110867.543
Iteration 2, inertia 110387.882
Iteration 3, inertia 110338.472
Iteration 4, inertia 110336.566
Converged at iteration 4: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 126834.000
Iteration 1, inertia 112466.139
Iteration 2, inertia 112265.018
Iteration 3, inertia 112054.180
Iteration 4, inertia 112050.439
Iteration 5, inertia 112050.330
Converged at iteration 5: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 137212.000
Iteration 1, inertia 113875.897
Iteration 2, inertia 113648.157

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Iteration 3, inertia 113427.168
Iteration 4, inertia 113392.668
Iteration 5, inertia 113370.315
Iteration 6, inertia 113369.197
Iteration 7, inertia 113365.894
Iteration 8, inertia 113365.601
Iteration 9, inertia 113365.517
Iteration 10, inertia 113365.411
Iteration 11, inertia 113365.373
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 158191.000
Iteration 1, inertia 116392.732
Iteration 2, inertia 116135.939
Iteration 3, inertia 116004.364
Iteration 4, inertia 115918.981
Iteration 5, inertia 115883.275
Iteration 6, inertia 115883.078
Iteration 7, inertia 115882.993
Converged at iteration 7: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 145474.000
Iteration 1, inertia 111818.284
Iteration 2, inertia 111474.175
Iteration 3, inertia 111221.376
Iteration 4, inertia 111164.931
Iteration 5, inertia 111131.377
Iteration 6, inertia 111036.909
Iteration 7, inertia 111035.543
Iteration 8, inertia 111035.380
Iteration 9, inertia 111035.282
Iteration 10, inertia 111035.221
Iteration 11, inertia 111035.195
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 160502.000
Iteration 1, inertia 115750.835
Iteration 2, inertia 114936.439
Iteration 3, inertia 114666.927
Iteration 4, inertia 114501.960
Iteration 5, inertia 114459.834
Iteration 6, inertia 114458.857
Converged at iteration 6: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete

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Iteration 0, inertia 135201.000
Iteration 1, inertia 110447.419
Iteration 2, inertia 110260.226
Iteration 3, inertia 110163.810
Iteration 4, inertia 110153.677
Iteration 5, inertia 110114.815
Iteration 6, inertia 110061.878
Iteration 7, inertia 110051.186
Iteration 8, inertia 109966.896
Iteration 9, inertia 109942.453
Iteration 10, inertia 109933.730
Iteration 11, inertia 109932.522
Iteration 12, inertia 109932.081
Iteration 13, inertia 109930.826
Iteration 14, inertia 109930.759
Iteration 15, inertia 109930.750
Converged at iteration 15: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 155887.000
Iteration 1, inertia 112150.050
Iteration 2, inertia 111493.363
Iteration 3, inertia 111122.165
Iteration 4, inertia 111038.454
Iteration 5, inertia 111031.779
Iteration 6, inertia 111027.358
Iteration 7, inertia 111021.594
Iteration 8, inertia 111020.957
Iteration 9, inertia 111018.759
Iteration 10, inertia 111018.353
Iteration 11, inertia 111010.567
Iteration 12, inertia 111000.034
Iteration 13, inertia 110994.399
Iteration 14, inertia 110992.181
Iteration 15, inertia 110991.143
Iteration 16, inertia 110986.882
Iteration 17, inertia 110976.897
Iteration 18, inertia 110974.936
Iteration 19, inertia 110974.782
Converged at iteration 19: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 162159.000
Iteration 1, inertia 116688.408
Iteration 2, inertia 116583.045
Iteration 3, inertia 116502.131
Iteration 4, inertia 116474.447
Iteration 5, inertia 116470.805

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Iteration 6, inertia 116470.670
Iteration 7, inertia 116470.321
Iteration 8, inertia 116468.500
Iteration 9, inertia 116454.752
Iteration 10, inertia 116441.871
Iteration 11, inertia 116435.504
Iteration 12, inertia 116414.023
Converged at iteration 12: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 142547.000
Iteration 1, inertia 108223.754
Iteration 2, inertia 108167.212
Iteration 3, inertia 108135.658
Iteration 4, inertia 108100.887
Iteration 5, inertia 108069.875
Iteration 6, inertia 108055.951
Iteration 7, inertia 108036.995
Iteration 8, inertia 108031.951
Iteration 9, inertia 108028.584
Iteration 10, inertia 108026.970
Iteration 11, inertia 108025.451
Iteration 12, inertia 108020.931
Iteration 13, inertia 107932.022
Iteration 14, inertia 107911.679
Iteration 15, inertia 107911.506
Converged at iteration 15: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 165156.000
Iteration 1, inertia 110772.191
Iteration 2, inertia 110291.663
Iteration 3, inertia 110242.240
Iteration 4, inertia 110240.334
Converged at iteration 4: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 126781.000
Iteration 1, inertia 112416.869
Iteration 2, inertia 112215.669
Iteration 3, inertia 112004.827
Iteration 4, inertia 112001.085
Iteration 5, inertia 112000.976
Converged at iteration 5: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 137070.000
Iteration 1, inertia 113765.449

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Iteration 2, inertia 113537.566
Iteration 3, inertia 113316.600
Iteration 4, inertia 113282.160
Iteration 5, inertia 113259.820
Iteration 6, inertia 113258.717
Iteration 7, inertia 113255.418
Iteration 8, inertia 113255.126
Iteration 9, inertia 113255.044
Iteration 10, inertia 113254.938
Iteration 11, inertia 113254.901
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 156761.000
Iteration 1, inertia 111426.516
Iteration 2, inertia 110460.606
Iteration 3, inertia 110344.833
Iteration 4, inertia 110243.040
Iteration 5, inertia 110212.344
Iteration 6, inertia 110212.147
Iteration 7, inertia 110212.062
Converged at iteration 7: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 145018.000
Iteration 1, inertia 111436.674
Iteration 2, inertia 111092.646
Iteration 3, inertia 110838.198
Iteration 4, inertia 110782.942
Iteration 5, inertia 110749.667
Iteration 6, inertia 110655.283
Iteration 7, inertia 110653.911
Iteration 8, inertia 110653.747
Iteration 9, inertia 110653.648
Iteration 10, inertia 110653.560
Converged at iteration 10: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 159911.000
Iteration 1, inertia 115184.410
Iteration 2, inertia 114476.551
Iteration 3, inertia 114206.348
Iteration 4, inertia 114018.962
Iteration 5, inertia 114009.845
Iteration 6, inertia 114009.231
Converged at iteration 6: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete

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Iteration 0, inertia 134427.000
Iteration 1, inertia 109770.712
Iteration 2, inertia 109583.491
Iteration 3, inertia 109487.169
Iteration 4, inertia 109476.923
Iteration 5, inertia 109438.062
Iteration 6, inertia 109384.984
Iteration 7, inertia 109374.400
Iteration 8, inertia 109290.091
Iteration 9, inertia 109265.660
Iteration 10, inertia 109256.942
Iteration 11, inertia 109255.807
Iteration 12, inertia 109255.375
Iteration 13, inertia 109254.189
Iteration 14, inertia 109254.014
Converged at iteration 14: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 154297.000
Iteration 1, inertia 109961.674
Iteration 2, inertia 109314.505
Iteration 3, inertia 109021.598
Iteration 4, inertia 108852.096
Iteration 5, inertia 108845.675
Iteration 6, inertia 108841.517
Iteration 7, inertia 108837.759
Iteration 8, inertia 108835.117
Iteration 9, inertia 108834.094
Iteration 10, inertia 108832.528
Iteration 11, inertia 108832.220
Iteration 12, inertia 108831.804
Iteration 13, inertia 108821.361
Iteration 14, inertia 108816.431
Iteration 15, inertia 108812.439
Iteration 16, inertia 108811.706
Converged at iteration 16: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 161767.000
Iteration 1, inertia 116411.661
Iteration 2, inertia 116306.184
Iteration 3, inertia 116236.346
Iteration 4, inertia 116197.974
Iteration 5, inertia 116194.126
Iteration 6, inertia 116193.951
Iteration 7, inertia 116193.821
Iteration 8, inertia 116193.547
Iteration 9, inertia 116192.072

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Iteration 10, inertia 116179.558
Iteration 11, inertia 116166.372
Iteration 12, inertia 116159.149
Iteration 13, inertia 116137.664
Converged at iteration 13: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 142491.000
Iteration 1, inertia 108177.088
Iteration 2, inertia 108120.518
Iteration 3, inertia 108088.961
Iteration 4, inertia 108054.191
Iteration 5, inertia 108023.177
Iteration 6, inertia 108009.252
Iteration 7, inertia 107990.301
Iteration 8, inertia 107985.257
Iteration 9, inertia 107981.889
Iteration 10, inertia 107980.277
Iteration 11, inertia 107978.758
Iteration 12, inertia 107974.238
Iteration 13, inertia 107885.335
Iteration 14, inertia 107864.991
Iteration 15, inertia 107864.818
Converged at iteration 15: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 154687.000
Iteration 1, inertia 110630.408
Iteration 2, inertia 110146.359
Iteration 3, inertia 110098.586
Iteration 4, inertia 110096.767
Converged at iteration 4: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 126472.000
Iteration 1, inertia 112140.568
Iteration 2, inertia 111938.795
Iteration 3, inertia 111727.672
Iteration 4, inertia 111724.291
Iteration 5, inertia 111724.182
Converged at iteration 5: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 137000.000
Iteration 1, inertia 113707.371
Iteration 2, inertia 113479.529
Iteration 3, inertia 113258.555
Iteration 4, inertia 113224.102

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Iteration 5, inertia 113201.760
Iteration 6, inertia 113200.654
Iteration 7, inertia 113197.354
Iteration 8, inertia 113197.062
Iteration 9, inertia 113196.979
Iteration 10, inertia 113196.873
Iteration 11, inertia 113196.835
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 145557.000
Iteration 1, inertia 110016.765
Iteration 2, inertia 109367.943
Iteration 3, inertia 109321.655
Iteration 4, inertia 109216.240
Iteration 5, inertia 109121.131
Iteration 6, inertia 109060.296
Iteration 7, inertia 108821.202
Iteration 8, inertia 108440.468
Iteration 9, inertia 108169.538
Iteration 10, inertia 108159.476
Iteration 11, inertia 108158.537
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 144943.000
Iteration 1, inertia 111377.159
Iteration 2, inertia 111032.476
Iteration 3, inertia 110778.467
Iteration 4, inertia 110723.209
Iteration 5, inertia 110690.893
Iteration 6, inertia 110595.663
Iteration 7, inertia 110594.146
Iteration 8, inertia 110593.985
Iteration 9, inertia 110593.889
Iteration 10, inertia 110593.829
Iteration 11, inertia 110593.803
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 151703.000
Iteration 1, inertia 108368.856
Iteration 2, inertia 107742.684
Iteration 3, inertia 107413.965
Iteration 4, inertia 107293.512
Iteration 5, inertia 107203.783
Iteration 6, inertia 107201.265
Converged at iteration 6: center shift 0.000000e+00 within tolerance

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1.071728e-07

Initialization complete

Iteration 0, inertia 134094.000
Iteration 1, inertia 109514.224
Iteration 2, inertia 109327.100
Iteration 3, inertia 109230.795
Iteration 4, inertia 109220.434
Iteration 5, inertia 109183.240
Iteration 6, inertia 109128.743
Iteration 7, inertia 109115.625
Iteration 8, inertia 109030.976
Iteration 9, inertia 109008.687
Iteration 10, inertia 109000.128
Iteration 11, inertia 108999.336
Iteration 12, inertia 108998.919
Iteration 13, inertia 108997.767
Iteration 14, inertia 108997.592

Converged at iteration 14: center shift 0.000000e+00 within tolerance

1.071728e-07

Initialization complete

Iteration 0, inertia 147709.000
Iteration 1, inertia 109470.417
Iteration 2, inertia 108996.857
Iteration 3, inertia 108668.301
Iteration 4, inertia 108497.386
Iteration 5, inertia 108489.984
Iteration 6, inertia 108481.561
Iteration 7, inertia 108480.001
Iteration 8, inertia 108477.385
Iteration 9, inertia 108476.593
Iteration 10, inertia 108475.056
Iteration 11, inertia 108472.161
Iteration 12, inertia 108449.143
Iteration 13, inertia 108274.282
Iteration 14, inertia 108206.993
Iteration 15, inertia 108172.153
Iteration 16, inertia 108171.152
Iteration 17, inertia 108169.113
Iteration 18, inertia 108169.024
Iteration 19, inertia 108168.819
Iteration 20, inertia 108168.181
Iteration 21, inertia 108166.957
Iteration 22, inertia 108165.995
Iteration 23, inertia 108165.235
Iteration 24, inertia 108161.467
Iteration 25, inertia 108152.275
Iteration 26, inertia 108149.831
Iteration 27, inertia 108149.742

Converged at iteration 27: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 154650.000
 Iteration 1, inertia 110605.032
 Iteration 2, inertia 110493.811
 Iteration 3, inertia 110401.220
 Iteration 4, inertia 110340.817
 Iteration 5, inertia 110330.844
 Iteration 6, inertia 110330.755
 Converged at iteration 6: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 142378.000
 Iteration 1, inertia 108039.203
 Iteration 2, inertia 107979.966
 Iteration 3, inertia 107948.417
 Iteration 4, inertia 107913.625
 Iteration 5, inertia 107882.614
 Iteration 6, inertia 107868.686
 Iteration 7, inertia 107849.743
 Iteration 8, inertia 107844.686
 Iteration 9, inertia 107841.313
 Iteration 10, inertia 107839.698
 Iteration 11, inertia 107838.301
 Iteration 12, inertia 107834.895
 Iteration 13, inertia 107748.199
 Iteration 14, inertia 107726.502
 Iteration 15, inertia 107724.331
 Iteration 16, inertia 107724.266
 Converged at iteration 16: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 154572.000
 Iteration 1, inertia 110536.677
 Iteration 2, inertia 110052.654
 Iteration 3, inertia 110004.879
 Iteration 4, inertia 110003.060
 Converged at iteration 4: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 125982.000
 Iteration 1, inertia 111692.808
 Iteration 2, inertia 111490.217
 Iteration 3, inertia 111279.097
 Iteration 4, inertia 111275.849
 Iteration 5, inertia 111275.740
 Converged at iteration 5: center shift 0.000000e+00 within tolerance

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1.071728e-07
Initialization complete
Iteration 0, inertia 136786.000
Iteration 1, inertia 113427.133
Iteration 2, inertia 112846.874
Iteration 3, inertia 112482.133
Iteration 4, inertia 112356.023
Iteration 5, inertia 112347.969
Iteration 6, inertia 112339.143
Iteration 7, inertia 112329.248
Iteration 8, inertia 112326.472
Iteration 9, inertia 112323.656
Converged at iteration 9: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 145109.000
Iteration 1, inertia 109662.471
Iteration 2, inertia 109013.606
Iteration 3, inertia 108967.748
Iteration 4, inertia 108862.986
Iteration 5, inertia 108783.493
Iteration 6, inertia 108705.921
Iteration 7, inertia 108466.740
Iteration 8, inertia 108085.965
Iteration 9, inertia 107815.031
Iteration 10, inertia 107805.230
Iteration 11, inertia 107804.024
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 144787.000
Iteration 1, inertia 111246.823
Iteration 2, inertia 110902.388
Iteration 3, inertia 110647.800
Iteration 4, inertia 110592.602
Iteration 5, inertia 110560.477
Iteration 6, inertia 110465.314
Iteration 7, inertia 110463.829
Iteration 8, inertia 110463.635
Iteration 9, inertia 110463.539
Iteration 10, inertia 110463.507
Iteration 11, inertia 110463.453
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 151276.000
Iteration 1, inertia 108132.450
Iteration 2, inertia 107497.175

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Iteration 3, inertia 107163.905
Iteration 4, inertia 107037.933
Iteration 5, inertia 106948.196
Iteration 6, inertia 106945.678
Converged at iteration 6: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 127408.000
Iteration 1, inertia 109394.334
Iteration 2, inertia 109209.592
Iteration 3, inertia 109113.627
Iteration 4, inertia 109104.150
Iteration 5, inertia 109087.735
Iteration 6, inertia 108922.267
Iteration 7, inertia 108789.503
Iteration 8, inertia 108677.347
Iteration 9, inertia 108659.815
Iteration 10, inertia 108658.542
Converged at iteration 10: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 147583.000
Iteration 1, inertia 109368.782
Iteration 2, inertia 108895.205
Iteration 3, inertia 108566.608
Iteration 4, inertia 108395.637
Iteration 5, inertia 108388.237
Iteration 6, inertia 108379.663
Iteration 7, inertia 108378.190
Iteration 8, inertia 108375.565
Iteration 9, inertia 108374.582
Iteration 10, inertia 108371.677
Iteration 11, inertia 108366.487
Iteration 12, inertia 108228.778
Iteration 13, inertia 108133.637
Iteration 14, inertia 108092.109
Iteration 15, inertia 108070.522
Iteration 16, inertia 108069.507
Iteration 17, inertia 108067.469
Iteration 18, inertia 108067.381
Iteration 19, inertia 108067.178
Iteration 20, inertia 108066.540
Iteration 21, inertia 108065.312
Iteration 22, inertia 108064.353
Iteration 23, inertia 108063.596
Iteration 24, inertia 108059.830
Iteration 25, inertia 108050.627
Iteration 26, inertia 108048.103

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Converged at iteration 26: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 154479.000
Iteration 1, inertia 110476.511
Iteration 2, inertia 110365.276
Iteration 3, inertia 110271.604
Iteration 4, inertia 110210.635
Iteration 5, inertia 110202.010
Iteration 6, inertia 110202.002
Converged at iteration 6: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 142350.000
Iteration 1, inertia 108016.846
Iteration 2, inertia 107957.605
Iteration 3, inertia 107926.057
Iteration 4, inertia 107891.266
Iteration 5, inertia 107860.256
Iteration 6, inertia 107846.329
Iteration 7, inertia 107827.386
Iteration 8, inertia 107822.330
Iteration 9, inertia 107818.957
Iteration 10, inertia 107817.343
Iteration 11, inertia 107815.945
Iteration 12, inertia 107812.539
Iteration 13, inertia 107725.841
Iteration 14, inertia 107704.144
Iteration 15, inertia 107701.973
Iteration 16, inertia 107701.908
Converged at iteration 16: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 148248.000
Iteration 1, inertia 110416.444
Iteration 2, inertia 109917.031
Iteration 3, inertia 109773.847
Iteration 4, inertia 109714.729
Iteration 5, inertia 109534.571
Iteration 6, inertia 109531.664
Iteration 7, inertia 109525.395
Iteration 8, inertia 109524.948
Iteration 9, inertia 109524.871
Iteration 10, inertia 109524.676
Iteration 11, inertia 109522.130
Iteration 12, inertia 109522.050
Converged at iteration 12: center shift 0.000000e+00 within tolerance
1.071728e-07

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Initialization complete
Iteration 0, inertia 125686.000
Iteration 1, inertia 111431.259
Iteration 2, inertia 111228.264
Iteration 3, inertia 111017.079
Iteration 4, inertia 111013.695
Iteration 5, inertia 111013.586
Converged at iteration 5: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 136606.000
Iteration 1, inertia 113279.435
Iteration 2, inertia 112701.663
Iteration 3, inertia 112346.749
Iteration 4, inertia 112219.614
Iteration 5, inertia 112211.480
Iteration 6, inertia 112202.653
Iteration 7, inertia 112192.758
Iteration 8, inertia 112189.982
Iteration 9, inertia 112187.166
Converged at iteration 9: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 138783.000
Iteration 1, inertia 108275.657
Iteration 2, inertia 107198.224
Iteration 3, inertia 107170.871
Iteration 4, inertia 107136.283
Iteration 5, inertia 107073.444
Iteration 6, inertia 107052.917
Iteration 7, inertia 107052.847
Iteration 8, inertia 107052.767
Converged at iteration 8: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 144335.000
Iteration 1, inertia 110800.672
Iteration 2, inertia 110455.390
Iteration 3, inertia 110199.622
Iteration 4, inertia 110145.428
Iteration 5, inertia 110114.630
Iteration 6, inertia 110018.810
Iteration 7, inertia 110017.027
Iteration 8, inertia 110016.889
Iteration 9, inertia 110016.792
Iteration 10, inertia 110016.729
Iteration 11, inertia 110016.704
Converged at iteration 11: center shift 0.000000e+00 within tolerance

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1.071728e-07
Initialization complete
Iteration 0, inertia 151036.000
Iteration 1, inertia 107975.006
Iteration 2, inertia 107338.252
Iteration 3, inertia 106997.530
Iteration 4, inertia 106878.578
Iteration 5, inertia 106788.830
Iteration 6, inertia 106786.311
Converged at iteration 6: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 126746.000
Iteration 1, inertia 108828.629
Iteration 2, inertia 108643.838
Iteration 3, inertia 108548.144
Iteration 4, inertia 108538.317
Iteration 5, inertia 108522.114
Iteration 6, inertia 108356.620
Iteration 7, inertia 108223.629
Iteration 8, inertia 108111.431
Iteration 9, inertia 108093.899
Iteration 10, inertia 108092.625
Converged at iteration 10: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 147543.000
Iteration 1, inertia 109334.268
Iteration 2, inertia 108860.706
Iteration 3, inertia 108532.163
Iteration 4, inertia 108361.183
Iteration 5, inertia 108353.784
Iteration 6, inertia 108345.211
Iteration 7, inertia 108343.737
Iteration 8, inertia 108341.114
Iteration 9, inertia 108340.132
Iteration 10, inertia 108337.230
Iteration 11, inertia 108332.057
Iteration 12, inertia 108195.393
Iteration 13, inertia 108099.217
Iteration 14, inertia 108057.685
Iteration 15, inertia 108036.097
Iteration 16, inertia 108035.083
Iteration 17, inertia 108033.044
Iteration 18, inertia 108032.956
Iteration 19, inertia 108032.754
Iteration 20, inertia 108032.117
Iteration 21, inertia 108030.886

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Iteration 22, inertia 108029.926
 Iteration 23, inertia 108029.166
 Iteration 24, inertia 108025.401
 Iteration 25, inertia 108016.198
 Iteration 26, inertia 108013.674
 Converged at iteration 26: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 153958.000
 Iteration 1, inertia 110124.871
 Iteration 2, inertia 110005.727
 Iteration 3, inertia 109968.740
 Iteration 4, inertia 109952.157
 Iteration 5, inertia 109951.481
 Iteration 6, inertia 109951.477
 Converged at iteration 6: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 141894.000
 Iteration 1, inertia 107637.992
 Iteration 2, inertia 107578.694
 Iteration 3, inertia 107547.161
 Iteration 4, inertia 107512.385
 Iteration 5, inertia 107481.382
 Iteration 6, inertia 107467.469
 Iteration 7, inertia 107448.539
 Iteration 8, inertia 107443.494
 Iteration 9, inertia 107440.132
 Iteration 10, inertia 107438.526
 Iteration 11, inertia 107437.318
 Iteration 12, inertia 107436.037
 Iteration 13, inertia 107424.569
 Iteration 14, inertia 107335.897
 Iteration 15, inertia 107323.246
 Iteration 16, inertia 107323.187
 Converged at iteration 16: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 148182.000
 Iteration 1, inertia 110340.676
 Iteration 2, inertia 109841.295
 Iteration 3, inertia 109698.099
 Iteration 4, inertia 109639.021
 Iteration 5, inertia 109458.715
 Iteration 6, inertia 109454.146
 Iteration 7, inertia 109449.466
 Iteration 8, inertia 109449.075
 Iteration 9, inertia 109447.121

Iteration 10, inertia 109446.293
 Converged at iteration 10: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 125654.000
 Iteration 1, inertia 111399.931
 Iteration 2, inertia 111156.505
 Iteration 3, inertia 110783.844
 Iteration 4, inertia 110722.720
 Iteration 5, inertia 110456.511
 Iteration 6, inertia 110255.833
 Iteration 7, inertia 110227.214
 Converged at iteration 7: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 134498.000
 Iteration 1, inertia 111036.603
 Iteration 2, inertia 110467.548
 Iteration 3, inertia 110115.415
 Iteration 4, inertia 109968.679
 Iteration 5, inertia 109952.457
 Iteration 6, inertia 109948.235
 Converged at iteration 6: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 138695.000
 Iteration 1, inertia 108200.981
 Iteration 2, inertia 107123.549
 Iteration 3, inertia 107096.185
 Iteration 4, inertia 107061.565
 Iteration 5, inertia 106998.726
 Iteration 6, inertia 106978.199
 Iteration 7, inertia 106978.129
 Iteration 8, inertia 106978.049
 Converged at iteration 8: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 143673.000
 Iteration 1, inertia 110216.368
 Iteration 2, inertia 109871.800
 Iteration 3, inertia 109619.487
 Iteration 4, inertia 109562.832
 Iteration 5, inertia 109535.822
 Iteration 6, inertia 109435.006
 Iteration 7, inertia 109433.157
 Iteration 8, inertia 109432.966
 Iteration 9, inertia 109432.878
 Converged at iteration 9: center shift 0.000000e+00 within tolerance

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1.071728e-07
Initialization complete
Iteration 0, inertia 150476.000
Iteration 1, inertia 107575.754
Iteration 2, inertia 106971.467
Iteration 3, inertia 106608.336
Iteration 4, inertia 106527.033
Iteration 5, inertia 106439.570
Iteration 6, inertia 106437.052
Converged at iteration 6: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 126338.000
Iteration 1, inertia 108449.762
Iteration 2, inertia 108265.244
Iteration 3, inertia 108168.928
Iteration 4, inertia 108157.733
Iteration 5, inertia 108137.601
Iteration 6, inertia 107959.687
Iteration 7, inertia 107837.232
Iteration 8, inertia 107725.355
Iteration 9, inertia 107714.160
Iteration 10, inertia 107713.881
Converged at iteration 10: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 147299.000
Iteration 1, inertia 108975.757
Iteration 2, inertia 108510.425
Iteration 3, inertia 108180.699
Iteration 4, inertia 108002.644
Iteration 5, inertia 107994.455
Iteration 6, inertia 107986.021
Iteration 7, inertia 107984.293
Iteration 8, inertia 107981.184
Iteration 9, inertia 107979.738
Iteration 10, inertia 107976.515
Iteration 11, inertia 107938.300
Iteration 12, inertia 107749.049
Iteration 13, inertia 107704.587
Iteration 14, inertia 107677.270
Iteration 15, inertia 107674.943
Iteration 16, inertia 107674.839
Iteration 17, inertia 107674.266
Iteration 18, inertia 107673.593
Iteration 19, inertia 107672.382
Iteration 20, inertia 107671.492
Iteration 21, inertia 107667.761

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Iteration 22, inertia 107658.367
 Iteration 23, inertia 107655.656
 Iteration 24, inertia 107655.566
 Converged at iteration 24: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 153696.000
 Iteration 1, inertia 109835.169
 Iteration 2, inertia 109651.034
 Iteration 3, inertia 109482.410
 Iteration 4, inertia 109386.173
 Iteration 5, inertia 109334.553
 Iteration 6, inertia 109272.107
 Iteration 7, inertia 109259.810
 Iteration 8, inertia 109230.488
 Iteration 9, inertia 109225.961
 Converged at iteration 9: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 141510.000
 Iteration 1, inertia 107327.219
 Iteration 2, inertia 107267.851
 Iteration 3, inertia 107236.322
 Iteration 4, inertia 107201.554
 Iteration 5, inertia 107170.564
 Iteration 6, inertia 107156.653
 Iteration 7, inertia 107137.738
 Iteration 8, inertia 107132.692
 Iteration 9, inertia 107129.330
 Iteration 10, inertia 107127.726
 Iteration 11, inertia 107126.523
 Iteration 12, inertia 107125.443
 Iteration 13, inertia 107113.778
 Iteration 14, inertia 107025.105
 Iteration 15, inertia 107012.448
 Iteration 16, inertia 107012.390
 Converged at iteration 16: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 147938.000
 Iteration 1, inertia 110144.946
 Iteration 2, inertia 109645.625
 Iteration 3, inertia 109502.436
 Iteration 4, inertia 109443.399
 Iteration 5, inertia 109263.085
 Iteration 6, inertia 109258.509
 Iteration 7, inertia 109253.826
 Iteration 8, inertia 109253.435

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Iteration 9, inertia 109251.481
Iteration 10, inertia 109250.653
Converged at iteration 10: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 125564.000
Iteration 1, inertia 111315.649
Iteration 2, inertia 111072.126
Iteration 3, inertia 110699.451
Iteration 4, inertia 110638.320
Iteration 5, inertia 110372.116
Iteration 6, inertia 110171.469
Iteration 7, inertia 110142.850
Converged at iteration 7: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 134243.000
Iteration 1, inertia 110454.774
Iteration 2, inertia 109872.991
Iteration 3, inertia 109537.328
Iteration 4, inertia 109387.629
Iteration 5, inertia 109371.519
Iteration 6, inertia 109367.296
Converged at iteration 6: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 138370.000
Iteration 1, inertia 107933.790
Iteration 2, inertia 106856.185
Iteration 3, inertia 106828.854
Iteration 4, inertia 106794.316
Iteration 5, inertia 106731.481
Iteration 6, inertia 106710.954
Iteration 7, inertia 106710.885
Iteration 8, inertia 106710.805
Converged at iteration 8: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 143323.000
Iteration 1, inertia 109944.183
Iteration 2, inertia 109599.478
Iteration 3, inertia 109346.992
Iteration 4, inertia 109290.093
Iteration 5, inertia 109264.273
Iteration 6, inertia 109162.226
Iteration 7, inertia 109160.212
Iteration 8, inertia 109160.020
Iteration 9, inertia 109159.931

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Converged at iteration 9: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 150323.000
 Iteration 1, inertia 107461.690
 Iteration 2, inertia 106857.675
 Iteration 3, inertia 106496.325
 Iteration 4, inertia 106414.814
 Iteration 5, inertia 106325.334
 Iteration 6, inertia 106322.816
 Converged at iteration 6: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 126222.000
 Iteration 1, inertia 108234.906
 Iteration 2, inertia 108050.400
 Iteration 3, inertia 107954.112
 Iteration 4, inertia 107942.905
 Iteration 5, inertia 107922.839
 Iteration 6, inertia 107744.972
 Iteration 7, inertia 107622.477
 Iteration 8, inertia 107509.982
 Iteration 9, inertia 107499.409
 Iteration 10, inertia 107499.130
 Converged at iteration 10: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 146973.000
 Iteration 1, inertia 108760.493
 Iteration 2, inertia 108292.135
 Iteration 3, inertia 107961.734
 Iteration 4, inertia 107817.561
 Iteration 5, inertia 107804.072
 Iteration 6, inertia 107794.560
 Iteration 7, inertia 107793.244
 Iteration 8, inertia 107790.963
 Converged at iteration 8: center shift 0.000000e+00 within tolerance
 1.071728e-07
 Initialization complete
 Iteration 0, inertia 149917.000
 Iteration 1, inertia 107312.857
 Iteration 2, inertia 107017.674
 Iteration 3, inertia 106826.610
 Iteration 4, inertia 106821.443
 Iteration 5, inertia 106820.356
 Iteration 6, inertia 106820.259
 Converged at iteration 6: center shift 0.000000e+00 within tolerance
 1.071728e-07

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Initialization complete
Iteration 0, inertia 141441.000
Iteration 1, inertia 107267.629
Iteration 2, inertia 107208.247
Iteration 3, inertia 107176.717
Iteration 4, inertia 107141.951
Iteration 5, inertia 107110.955
Iteration 6, inertia 107097.031
Iteration 7, inertia 107078.111
Iteration 8, inertia 107073.062
Iteration 9, inertia 107069.698
Iteration 10, inertia 107068.093
Iteration 11, inertia 107066.787
Iteration 12, inertia 107065.731
Iteration 13, inertia 107057.335
Iteration 14, inertia 106967.423
Iteration 15, inertia 106954.518
Iteration 16, inertia 106954.452
Converged at iteration 16: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 147472.000
Iteration 1, inertia 109766.570
Iteration 2, inertia 109271.071
Iteration 3, inertia 109124.291
Iteration 4, inertia 109065.408
Iteration 5, inertia 108885.196
Iteration 6, inertia 108881.346
Iteration 7, inertia 108875.915
Iteration 8, inertia 108875.552
Iteration 9, inertia 108875.474
Iteration 10, inertia 108875.279
Iteration 11, inertia 108872.734
Iteration 12, inertia 108872.654
Converged at iteration 12: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 125536.000
Iteration 1, inertia 111289.822
Iteration 2, inertia 111046.241
Iteration 3, inertia 110673.539
Iteration 4, inertia 110612.361
Iteration 5, inertia 110347.326
Iteration 6, inertia 110147.470
Iteration 7, inertia 110118.784
Converged at iteration 7: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete

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Iteration 0, inertia 134179.000
Iteration 1, inertia 110387.813
Iteration 2, inertia 109791.943
Iteration 3, inertia 109457.252
Iteration 4, inertia 109307.085
Iteration 5, inertia 109290.659
Iteration 6, inertia 109286.435
Converged at iteration 6: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 137671.000
Iteration 1, inertia 107366.707
Iteration 2, inertia 106290.609
Iteration 3, inertia 106261.787
Iteration 4, inertia 106228.005
Iteration 5, inertia 106164.297
Iteration 6, inertia 106143.755
Iteration 7, inertia 106143.686
Iteration 8, inertia 106143.606
Converged at iteration 8: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 143257.000
Iteration 1, inertia 109868.570
Iteration 2, inertia 109523.863
Iteration 3, inertia 109271.347
Iteration 4, inertia 109214.346
Iteration 5, inertia 109189.707
Iteration 6, inertia 109086.685
Iteration 7, inertia 109084.593
Iteration 8, inertia 109084.400
Iteration 9, inertia 109084.312
Converged at iteration 9: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 150119.000
Iteration 1, inertia 107308.357
Iteration 2, inertia 106702.026
Iteration 3, inertia 106342.931
Iteration 4, inertia 106261.384
Iteration 5, inertia 106171.901
Iteration 6, inertia 106169.383
Converged at iteration 6: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 126185.000
Iteration 1, inertia 108191.947
Iteration 2, inertia 108007.436

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Iteration 3, inertia 107911.147
Iteration 4, inertia 107899.941
Iteration 5, inertia 107879.872
Iteration 6, inertia 107702.003
Iteration 7, inertia 107579.524
Iteration 8, inertia 107467.026
Iteration 9, inertia 107456.453
Iteration 10, inertia 107456.174
Converged at iteration 10: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 146903.000
Iteration 1, inertia 108702.296
Iteration 2, inertia 108021.563
Iteration 3, inertia 107607.264
Iteration 4, inertia 107449.340
Iteration 5, inertia 107433.214
Iteration 6, inertia 107423.540
Iteration 7, inertia 107421.985
Iteration 8, inertia 107418.397
Converged at iteration 8: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 148953.000
Iteration 1, inertia 106609.381
Iteration 2, inertia 106310.512
Iteration 3, inertia 106120.715
Iteration 4, inertia 106115.503
Iteration 5, inertia 106114.412
Iteration 6, inertia 106114.314
Converged at iteration 6: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 123047.000
Iteration 1, inertia 108751.315
Iteration 2, inertia 108015.876
Iteration 3, inertia 107875.026
Iteration 4, inertia 107862.073
Iteration 5, inertia 107852.642
Iteration 6, inertia 107827.868
Iteration 7, inertia 107820.401
Iteration 8, inertia 107807.647
Iteration 9, inertia 107656.417
Iteration 10, inertia 107623.047
Iteration 11, inertia 107622.016
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete

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Iteration 0, inertia 123971.000
Iteration 1, inertia 110267.419
Iteration 2, inertia 110116.938
Iteration 3, inertia 109750.157
Iteration 4, inertia 109740.370
Iteration 5, inertia 109739.315
Iteration 6, inertia 109736.854
Iteration 7, inertia 109736.655
Converged at iteration 7: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 123939.000
Iteration 1, inertia 110152.417
Iteration 2, inertia 109923.324
Iteration 3, inertia 109325.959
Iteration 4, inertia 109113.202
Iteration 5, inertia 109052.471
Iteration 6, inertia 109017.773
Iteration 7, inertia 109012.405
Converged at iteration 7: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 135465.000
Iteration 1, inertia 110450.263
Iteration 2, inertia 109623.694
Iteration 3, inertia 108941.815
Iteration 4, inertia 108183.083
Iteration 5, inertia 107851.946
Iteration 6, inertia 107828.931
Iteration 7, inertia 107812.866
Iteration 8, inertia 107737.537
Iteration 9, inertia 107728.062
Iteration 10, inertia 107723.950
Iteration 11, inertia 107723.788
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 117171.000
Iteration 1, inertia 110018.237
Iteration 2, inertia 108925.037
Iteration 3, inertia 108592.866
Iteration 4, inertia 108408.769
Iteration 5, inertia 108379.690
Iteration 6, inertia 108363.178
Iteration 7, inertia 108288.835
Iteration 8, inertia 107930.214
Iteration 9, inertia 107784.612
Iteration 10, inertia 107780.019

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Iteration 11, inertia 107776.818
Iteration 12, inertia 107769.426
Iteration 13, inertia 107768.955
Converged at iteration 13: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 134415.000
Iteration 1, inertia 110700.968
Iteration 2, inertia 110664.087
Iteration 3, inertia 110654.714
Iteration 4, inertia 110654.174
Iteration 5, inertia 110653.285
Iteration 6, inertia 110652.324
Iteration 7, inertia 110651.078
Iteration 8, inertia 110650.793
Converged at iteration 8: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 146347.000
Iteration 1, inertia 107042.705
Iteration 2, inertia 105994.889
Iteration 3, inertia 105803.876
Iteration 4, inertia 105760.425
Iteration 5, inertia 105751.873
Iteration 6, inertia 105746.901
Iteration 7, inertia 105745.499
Iteration 8, inertia 105729.198
Iteration 9, inertia 105704.930
Iteration 10, inertia 105662.486
Iteration 11, inertia 105649.372
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 127424.000
Iteration 1, inertia 110736.487
Iteration 2, inertia 110585.763
Iteration 3, inertia 110490.140
Iteration 4, inertia 110373.283
Iteration 5, inertia 110322.870
Iteration 6, inertia 110197.372
Iteration 7, inertia 109855.662
Iteration 8, inertia 109840.237
Iteration 9, inertia 109804.946
Iteration 10, inertia 109745.067
Iteration 11, inertia 109744.149
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete

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Iteration 0, inertia 123360.000
Iteration 1, inertia 109524.625
Iteration 2, inertia 109362.754
Iteration 3, inertia 109359.547
Iteration 4, inertia 109287.186
Iteration 5, inertia 109180.597
Iteration 6, inertia 109124.917
Iteration 7, inertia 108922.908
Iteration 8, inertia 108762.801
Iteration 9, inertia 108454.311
Iteration 10, inertia 108386.287
Iteration 11, inertia 108386.144
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 136473.000
Iteration 1, inertia 106423.211
Iteration 2, inertia 106119.590
Iteration 3, inertia 106069.773
Iteration 4, inertia 105981.979
Iteration 5, inertia 105889.992
Iteration 6, inertia 105712.609
Iteration 7, inertia 105525.726
Iteration 8, inertia 105484.103
Iteration 9, inertia 105476.072
Iteration 10, inertia 105428.593
Iteration 11, inertia 105425.830
Iteration 12, inertia 105408.594
Iteration 13, inertia 105389.140
Iteration 14, inertia 105389.127
Converged at iteration 14: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 123007.000
Iteration 1, inertia 108715.288
Iteration 2, inertia 107980.702
Iteration 3, inertia 107839.533
Iteration 4, inertia 107826.166
Iteration 5, inertia 107816.641
Iteration 6, inertia 107791.865
Iteration 7, inertia 107784.396
Iteration 8, inertia 107771.645
Iteration 9, inertia 107620.439
Iteration 10, inertia 107587.068
Iteration 11, inertia 107586.037
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete

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Iteration 0, inertia 123649.000
Iteration 1, inertia 109983.310
Iteration 2, inertia 109833.051
Iteration 3, inertia 109466.284
Iteration 4, inertia 109456.499
Iteration 5, inertia 109455.447
Iteration 6, inertia 109452.991
Iteration 7, inertia 109452.792
Converged at iteration 7: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 123808.000
Iteration 1, inertia 109996.161
Iteration 2, inertia 109745.207
Iteration 3, inertia 109148.367
Iteration 4, inertia 108935.145
Iteration 5, inertia 108872.584
Iteration 6, inertia 108837.789
Iteration 7, inertia 108834.418
Converged at iteration 7: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 135430.000
Iteration 1, inertia 110405.945
Iteration 2, inertia 109582.155
Iteration 3, inertia 108921.932
Iteration 4, inertia 108279.707
Iteration 5, inertia 107816.960
Iteration 6, inertia 107786.524
Iteration 7, inertia 107766.654
Iteration 8, inertia 107692.382
Iteration 9, inertia 107684.747
Iteration 10, inertia 107680.637
Iteration 11, inertia 107680.508
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 116527.000
Iteration 1, inertia 109533.885
Iteration 2, inertia 108420.469
Iteration 3, inertia 107893.709
Iteration 4, inertia 107602.802
Iteration 5, inertia 107371.194
Iteration 6, inertia 107347.270
Iteration 7, inertia 107346.369
Iteration 8, inertia 107344.552
Iteration 9, inertia 107344.187
Converged at iteration 9: center shift 0.000000e+00 within tolerance

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1.071728e-07
Initialization complete
Iteration 0, inertia 134267.000
Iteration 1, inertia 110537.535
Iteration 2, inertia 110500.659
Iteration 3, inertia 110491.288
Iteration 4, inertia 110490.749
Iteration 5, inertia 110489.855
Iteration 6, inertia 110488.894
Iteration 7, inertia 110487.644
Iteration 8, inertia 110487.359
Converged at iteration 8: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 145445.000
Iteration 1, inertia 106465.310
Iteration 2, inertia 105483.922
Iteration 3, inertia 105383.903
Iteration 4, inertia 105321.985
Iteration 5, inertia 105283.468
Iteration 6, inertia 105245.637
Iteration 7, inertia 105244.726
Iteration 8, inertia 105233.522
Iteration 9, inertia 105203.540
Iteration 10, inertia 105161.098
Iteration 11, inertia 105147.985
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 126762.000
Iteration 1, inertia 110461.302
Iteration 2, inertia 110225.629
Iteration 3, inertia 109907.422
Iteration 4, inertia 109486.389
Iteration 5, inertia 109361.757
Iteration 6, inertia 109313.534
Iteration 7, inertia 109004.560
Iteration 8, inertia 108865.663
Iteration 9, inertia 108803.217
Iteration 10, inertia 108777.611
Iteration 11, inertia 108774.098
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 123165.000
Iteration 1, inertia 109348.736
Iteration 2, inertia 109186.864
Iteration 3, inertia 109183.654

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Iteration 4, inertia 109111.309
Iteration 5, inertia 109004.714
Iteration 6, inertia 108949.118
Iteration 7, inertia 108747.127
Iteration 8, inertia 108586.932
Iteration 9, inertia 108278.573
Iteration 10, inertia 108210.559
Iteration 11, inertia 108210.416
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 135961.000
Iteration 1, inertia 106010.042
Iteration 2, inertia 105706.670
Iteration 3, inertia 105656.598
Iteration 4, inertia 105569.592
Iteration 5, inertia 105478.999
Iteration 6, inertia 105304.659
Iteration 7, inertia 105113.255
Iteration 8, inertia 105070.965
Iteration 9, inertia 105062.878
Iteration 10, inertia 105015.375
Iteration 11, inertia 105011.646
Iteration 12, inertia 104993.312
Iteration 13, inertia 104976.000
Iteration 14, inertia 104975.986
Converged at iteration 14: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 122861.000
Iteration 1, inertia 108591.541
Iteration 2, inertia 107856.502
Iteration 3, inertia 107715.080
Iteration 4, inertia 107702.221
Iteration 5, inertia 107692.708
Iteration 6, inertia 107667.906
Iteration 7, inertia 107660.422
Iteration 8, inertia 107647.662
Iteration 9, inertia 107496.553
Iteration 10, inertia 107463.022
Iteration 11, inertia 107461.991
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 123259.000
Iteration 1, inertia 109336.931
Iteration 2, inertia 109186.116
Iteration 3, inertia 108818.989

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Iteration 4, inertia 108809.190
Iteration 5, inertia 108808.091
Iteration 6, inertia 108805.631
Iteration 7, inertia 108805.433
Converged at iteration 7: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 123587.000
Iteration 1, inertia 109792.547
Iteration 2, inertia 109541.628
Iteration 3, inertia 108944.757
Iteration 4, inertia 108731.576
Iteration 5, inertia 108669.374
Iteration 6, inertia 108634.594
Iteration 7, inertia 108631.009
Converged at iteration 7: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 134613.000
Iteration 1, inertia 109705.648
Iteration 2, inertia 108884.334
Iteration 3, inertia 108229.666
Iteration 4, inertia 107451.028
Iteration 5, inertia 107109.022
Iteration 6, inertia 107087.211
Iteration 7, inertia 107069.442
Iteration 8, inertia 106994.875
Iteration 9, inertia 106986.967
Iteration 10, inertia 106982.845
Iteration 11, inertia 106982.683
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 116489.000
Iteration 1, inertia 109498.224
Iteration 2, inertia 108387.684
Iteration 3, inertia 107861.066
Iteration 4, inertia 107569.745
Iteration 5, inertia 107338.137
Iteration 6, inertia 107314.213
Iteration 7, inertia 107313.312
Iteration 8, inertia 107311.496
Iteration 9, inertia 107311.130
Converged at iteration 9: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 134105.000
Iteration 1, inertia 110389.634

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Iteration 2, inertia 110352.761
Iteration 3, inertia 110343.390
Iteration 4, inertia 110342.852
Iteration 5, inertia 110341.959
Iteration 6, inertia 110340.997
Iteration 7, inertia 110339.747
Iteration 8, inertia 110339.463
Converged at iteration 8: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 145221.000
Iteration 1, inertia 106175.017
Iteration 2, inertia 105190.483
Iteration 3, inertia 105089.653
Iteration 4, inertia 105026.688
Iteration 5, inertia 104988.128
Iteration 6, inertia 104950.270
Iteration 7, inertia 104949.110
Iteration 8, inertia 104937.534
Iteration 9, inertia 104908.197
Iteration 10, inertia 104865.755
Iteration 11, inertia 104852.641
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 125077.000
Iteration 1, inertia 110139.433
Iteration 2, inertia 109891.051
Iteration 3, inertia 109571.862
Iteration 4, inertia 109151.206
Iteration 5, inertia 109025.972
Iteration 6, inertia 108977.677
Iteration 7, inertia 108668.703
Iteration 8, inertia 108529.806
Iteration 9, inertia 108467.361
Iteration 10, inertia 108441.754
Iteration 11, inertia 108438.242
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 123067.000
Iteration 1, inertia 109263.053
Iteration 2, inertia 109101.182
Iteration 3, inertia 109097.974
Iteration 4, inertia 109025.660
Iteration 5, inertia 108919.086
Iteration 6, inertia 108863.542
Iteration 7, inertia 108661.562

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Iteration 8, inertia 108501.486
Iteration 9, inertia 108192.978
Iteration 10, inertia 108124.947
Iteration 11, inertia 108124.804
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 135811.000
Iteration 1, inertia 105594.360
Iteration 2, inertia 105297.636
Iteration 3, inertia 105238.964
Iteration 4, inertia 105144.331
Iteration 5, inertia 105054.512
Iteration 6, inertia 104889.619
Iteration 7, inertia 104699.178
Iteration 8, inertia 104656.807
Iteration 9, inertia 104648.742
Iteration 10, inertia 104601.172
Iteration 11, inertia 104597.802
Iteration 12, inertia 104578.222
Iteration 13, inertia 104560.349
Iteration 14, inertia 104560.335
Converged at iteration 14: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 122790.000
Iteration 1, inertia 108512.207
Iteration 2, inertia 107777.425
Iteration 3, inertia 107636.284
Iteration 4, inertia 107625.172
Iteration 5, inertia 107614.464
Iteration 6, inertia 107593.406
Iteration 7, inertia 107581.342
Iteration 8, inertia 107569.831
Iteration 9, inertia 107415.912
Iteration 10, inertia 107383.632
Iteration 11, inertia 107382.601
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 122804.000
Iteration 1, inertia 108920.905
Iteration 2, inertia 108769.345
Iteration 3, inertia 108402.131
Iteration 4, inertia 108392.194
Iteration 5, inertia 108391.959
Iteration 6, inertia 108390.962
Iteration 7, inertia 108388.349

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Converged at iteration 7: center shift 0.000000e+00 within tolerance
1.071728e-07

Initialization complete

Iteration 0, inertia 123452.000
Iteration 1, inertia 109667.384
Iteration 2, inertia 109416.487
Iteration 3, inertia 108819.623
Iteration 4, inertia 108606.510
Iteration 5, inertia 108544.362
Iteration 6, inertia 108509.594
Iteration 7, inertia 108506.009

Converged at iteration 7: center shift 0.000000e+00 within tolerance
1.071728e-07

Initialization complete

Iteration 0, inertia 134543.000
Iteration 1, inertia 109645.527
Iteration 2, inertia 108824.251
Iteration 3, inertia 108168.450
Iteration 4, inertia 107390.442
Iteration 5, inertia 107048.886
Iteration 6, inertia 107027.067
Iteration 7, inertia 107009.226
Iteration 8, inertia 106934.662
Iteration 9, inertia 106926.776
Iteration 10, inertia 106922.655
Iteration 11, inertia 106922.493

Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07

Initialization complete

Iteration 0, inertia 116345.000
Iteration 1, inertia 109363.278
Iteration 2, inertia 108253.078
Iteration 3, inertia 107726.688
Iteration 4, inertia 107435.022
Iteration 5, inertia 107203.520
Iteration 6, inertia 107179.358
Iteration 7, inertia 107178.458
Iteration 8, inertia 107176.641
Iteration 9, inertia 107176.276

Converged at iteration 9: center shift 0.000000e+00 within tolerance
1.071728e-07

Initialization complete

Iteration 0, inertia 134010.000
Iteration 1, inertia 110305.420
Iteration 2, inertia 110268.549
Iteration 3, inertia 110259.180
Iteration 4, inertia 110258.642
Iteration 5, inertia 110257.749

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Iteration 6, inertia 110256.786
Iteration 7, inertia 110255.537
Iteration 8, inertia 110255.252
Converged at iteration 8: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 142948.000
Iteration 1, inertia 105320.977
Iteration 2, inertia 105006.366
Iteration 3, inertia 104957.984
Iteration 4, inertia 104893.863
Iteration 5, inertia 104845.243
Iteration 6, inertia 104813.072
Iteration 7, inertia 104770.512
Iteration 8, inertia 104715.155
Iteration 9, inertia 104685.353
Iteration 10, inertia 104642.911
Iteration 11, inertia 104629.796
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 124303.000
Iteration 1, inertia 109439.337
Iteration 2, inertia 109191.344
Iteration 3, inertia 108880.210
Iteration 4, inertia 108452.476
Iteration 5, inertia 108327.109
Iteration 6, inertia 108277.923
Iteration 7, inertia 107966.971
Iteration 8, inertia 107830.033
Iteration 9, inertia 107768.757
Iteration 10, inertia 107742.675
Iteration 11, inertia 107739.162
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 123007.000
Iteration 1, inertia 109207.897
Iteration 2, inertia 109046.023
Iteration 3, inertia 109042.816
Iteration 4, inertia 108970.503
Iteration 5, inertia 108863.923
Iteration 6, inertia 108808.399
Iteration 7, inertia 108607.046
Iteration 8, inertia 108463.551
Iteration 9, inertia 108138.980
Iteration 10, inertia 108069.805
Iteration 11, inertia 108069.662

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Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07

Initialization complete

Iteration 0, inertia 135345.000
Iteration 1, inertia 105221.898
Iteration 2, inertia 104924.344
Iteration 3, inertia 104865.661
Iteration 4, inertia 104772.781
Iteration 5, inertia 104681.798
Iteration 6, inertia 104516.550
Iteration 7, inertia 104326.224
Iteration 8, inertia 104284.152
Iteration 9, inertia 104276.060
Iteration 10, inertia 104228.488
Iteration 11, inertia 104225.118
Iteration 12, inertia 104205.538
Iteration 13, inertia 104187.663
Iteration 14, inertia 104187.649

Converged at iteration 14: center shift 0.000000e+00 within tolerance
1.071728e-07

Initialization complete

Iteration 0, inertia 122750.000
Iteration 1, inertia 108476.261
Iteration 2, inertia 107741.498
Iteration 3, inertia 107600.359
Iteration 4, inertia 107589.247
Iteration 5, inertia 107578.540
Iteration 6, inertia 107557.482
Iteration 7, inertia 107545.418
Iteration 8, inertia 107533.908
Iteration 9, inertia 107380.008
Iteration 10, inertia 107347.727
Iteration 11, inertia 107346.696

Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07

Initialization complete

Iteration 0, inertia 122756.000
Iteration 1, inertia 108877.933
Iteration 2, inertia 108726.377
Iteration 3, inertia 108359.165
Iteration 4, inertia 108349.229
Iteration 5, inertia 108348.994
Iteration 6, inertia 108347.998
Iteration 7, inertia 108345.385

Converged at iteration 7: center shift 0.000000e+00 within tolerance
1.071728e-07

Initialization complete

Iteration 0, inertia 123130.000

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Iteration 1, inertia 109383.531
Iteration 2, inertia 109132.865
Iteration 3, inertia 108536.541
Iteration 4, inertia 108323.188
Iteration 5, inertia 108260.502
Iteration 6, inertia 108225.996
Iteration 7, inertia 108222.410
Converged at iteration 7: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 134318.000
Iteration 1, inertia 109450.076
Iteration 2, inertia 108630.939
Iteration 3, inertia 107956.077
Iteration 4, inertia 107186.286
Iteration 5, inertia 106852.800
Iteration 6, inertia 106831.544
Iteration 7, inertia 106812.996
Iteration 8, inertia 106738.822
Iteration 9, inertia 106731.258
Iteration 10, inertia 106727.137
Iteration 11, inertia 106726.975
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 116202.000
Iteration 1, inertia 109229.417
Iteration 2, inertia 108119.419
Iteration 3, inertia 107570.517
Iteration 4, inertia 107193.654
Iteration 5, inertia 107047.525
Iteration 6, inertia 107045.462
Iteration 7, inertia 107044.751
Iteration 8, inertia 107042.968
Iteration 9, inertia 107042.622
Converged at iteration 9: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 133860.000
Iteration 1, inertia 110122.910
Iteration 2, inertia 110085.871
Iteration 3, inertia 110076.493
Iteration 4, inertia 110075.052
Iteration 5, inertia 110074.091
Iteration 6, inertia 110072.843
Iteration 7, inertia 110072.559
Converged at iteration 7: center shift 0.000000e+00 within tolerance
1.071728e-07

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Initialization complete
Iteration 0, inertia 142747.000
Iteration 1, inertia 104794.319
Iteration 2, inertia 104479.483
Iteration 3, inertia 104431.317
Iteration 4, inertia 104367.352
Iteration 5, inertia 104318.485
Iteration 6, inertia 104286.240
Iteration 7, inertia 104243.628
Iteration 8, inertia 104188.236
Iteration 9, inertia 104158.440
Iteration 10, inertia 104115.953
Iteration 11, inertia 104102.838
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 123807.000
Iteration 1, inertia 108997.494
Iteration 2, inertia 108749.724
Iteration 3, inertia 108439.682
Iteration 4, inertia 108011.650
Iteration 5, inertia 107886.163
Iteration 6, inertia 107835.955
Iteration 7, inertia 107524.494
Iteration 8, inertia 107389.235
Iteration 9, inertia 107327.723
Iteration 10, inertia 107298.840
Iteration 11, inertia 107298.577
Iteration 12, inertia 107298.535
Converged at iteration 12: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 122734.000
Iteration 1, inertia 108973.696
Iteration 2, inertia 108811.806
Iteration 3, inertia 108808.601
Iteration 4, inertia 108736.304
Iteration 5, inertia 108629.652
Iteration 6, inertia 108574.137
Iteration 7, inertia 108372.745
Iteration 8, inertia 108228.944
Iteration 9, inertia 107905.203
Iteration 10, inertia 107835.432
Iteration 11, inertia 107835.289
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 134981.000

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Iteration 1, inertia 104950.768
Iteration 2, inertia 104653.245
Iteration 3, inertia 104594.545
Iteration 4, inertia 104501.637
Iteration 5, inertia 104410.419
Iteration 6, inertia 104245.415
Iteration 7, inertia 104054.997
Iteration 8, inertia 104012.932
Iteration 9, inertia 104004.988
Iteration 10, inertia 103957.657
Iteration 11, inertia 103955.991
Iteration 12, inertia 103941.168
Iteration 13, inertia 103916.581
Iteration 14, inertia 103916.365
Converged at iteration 14: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 122578.000
Iteration 1, inertia 108318.315
Iteration 2, inertia 107583.261
Iteration 3, inertia 107442.180
Iteration 4, inertia 107431.214
Iteration 5, inertia 107420.603
Iteration 6, inertia 107399.528
Iteration 7, inertia 107387.443
Iteration 8, inertia 107375.917
Iteration 9, inertia 107222.065
Iteration 10, inertia 107189.782
Iteration 11, inertia 107188.751
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 122338.000
Iteration 1, inertia 108508.283
Iteration 2, inertia 108356.911
Iteration 3, inertia 107989.723
Iteration 4, inertia 107979.921
Iteration 5, inertia 107978.933
Iteration 6, inertia 107976.211
Iteration 7, inertia 107975.939
Converged at iteration 7: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 122682.000
Iteration 1, inertia 108966.093
Iteration 2, inertia 108715.472
Iteration 3, inertia 108118.981
Iteration 4, inertia 107905.740

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Iteration 5, inertia 107844.062
Iteration 6, inertia 107809.201
Iteration 7, inertia 107805.214
Converged at iteration 7: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 133870.000
Iteration 1, inertia 109080.476
Iteration 2, inertia 108264.511
Iteration 3, inertia 107605.788
Iteration 4, inertia 106829.787
Iteration 5, inertia 106485.311
Iteration 6, inertia 106463.565
Iteration 7, inertia 106448.837
Iteration 8, inertia 106373.491
Iteration 9, inertia 106363.613
Iteration 10, inertia 106359.490
Iteration 11, inertia 106359.327
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 115514.000
Iteration 1, inertia 108534.816
Iteration 2, inertia 107424.301
Iteration 3, inertia 106902.336
Iteration 4, inertia 106611.767
Iteration 5, inertia 106410.283
Iteration 6, inertia 106351.296
Iteration 7, inertia 106350.396
Iteration 8, inertia 106348.579
Iteration 9, inertia 106348.214
Converged at iteration 9: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 133650.000
Iteration 1, inertia 109934.560
Iteration 2, inertia 109897.518
Iteration 3, inertia 109888.141
Iteration 4, inertia 109886.701
Iteration 5, inertia 109885.734
Iteration 6, inertia 109884.483
Iteration 7, inertia 109884.199
Converged at iteration 7: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 142711.000
Iteration 1, inertia 104641.902
Iteration 2, inertia 104244.404

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Iteration 3, inertia 104182.384
Iteration 4, inertia 104103.164
Iteration 5, inertia 103824.758
Iteration 6, inertia 103643.093
Iteration 7, inertia 103557.459
Iteration 8, inertia 103520.997
Iteration 9, inertia 103509.870
Converged at iteration 9: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 123408.000
Iteration 1, inertia 108771.843
Iteration 2, inertia 108495.123
Iteration 3, inertia 107946.350
Iteration 4, inertia 107354.848
Iteration 5, inertia 107110.990
Iteration 6, inertia 107051.274
Iteration 7, inertia 106770.520
Iteration 8, inertia 106592.469
Iteration 9, inertia 106525.410
Iteration 10, inertia 106508.677
Iteration 11, inertia 106508.494
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 122484.000
Iteration 1, inertia 108751.444
Iteration 2, inertia 108499.680
Iteration 3, inertia 108484.645
Iteration 4, inertia 108421.140
Iteration 5, inertia 108306.688
Iteration 6, inertia 108253.410
Iteration 7, inertia 108054.068
Iteration 8, inertia 107966.180
Iteration 9, inertia 107602.723
Iteration 10, inertia 107527.097
Iteration 11, inertia 107526.952
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 134491.000
Iteration 1, inertia 104597.262
Iteration 2, inertia 104400.889
Iteration 3, inertia 104213.886
Iteration 4, inertia 104132.868
Iteration 5, inertia 104062.553
Iteration 6, inertia 103929.970
Iteration 7, inertia 103759.993

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Iteration 8, inertia 103749.917
Iteration 9, inertia 103748.532
Iteration 10, inertia 103747.743
Iteration 11, inertia 103746.065
Iteration 12, inertia 103731.083
Iteration 13, inertia 103707.014
Iteration 14, inertia 103706.798
Converged at iteration 14: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 122023.000
Iteration 1, inertia 107784.819
Iteration 2, inertia 107049.743
Iteration 3, inertia 106909.016
Iteration 4, inertia 106898.120
Iteration 5, inertia 106887.469
Iteration 6, inertia 106865.073
Iteration 7, inertia 106854.297
Iteration 8, inertia 106842.881
Iteration 9, inertia 106688.986
Iteration 10, inertia 106656.908
Iteration 11, inertia 106655.877
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 122294.000
Iteration 1, inertia 108415.839
Iteration 2, inertia 108216.446
Iteration 3, inertia 107848.701
Iteration 4, inertia 107838.897
Iteration 5, inertia 107837.898
Iteration 6, inertia 107835.175
Iteration 7, inertia 107834.902
Converged at iteration 7: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 122429.000
Iteration 1, inertia 108736.261
Iteration 2, inertia 108485.702
Iteration 3, inertia 107889.051
Iteration 4, inertia 107675.894
Iteration 5, inertia 107614.367
Iteration 6, inertia 107580.959
Iteration 7, inertia 107575.585
Converged at iteration 7: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 133298.000

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Iteration 1, inertia 108622.201
Iteration 2, inertia 107813.997
Iteration 3, inertia 107140.991
Iteration 4, inertia 106377.765
Iteration 5, inertia 106032.158
Iteration 6, inertia 106006.496
Iteration 7, inertia 105996.913
Iteration 8, inertia 105931.535
Iteration 9, inertia 105907.473
Iteration 10, inertia 105907.254
Iteration 11, inertia 105903.252
Iteration 12, inertia 105903.118
Converged at iteration 12: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 115459.000
Iteration 1, inertia 108486.876
Iteration 2, inertia 107379.918
Iteration 3, inertia 106858.815
Iteration 4, inertia 106566.905
Iteration 5, inertia 106365.410
Iteration 6, inertia 106306.422
Iteration 7, inertia 106305.524
Iteration 8, inertia 106303.707
Iteration 9, inertia 106303.342
Converged at iteration 9: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 133572.000
Iteration 1, inertia 109864.302
Iteration 2, inertia 109827.263
Iteration 3, inertia 109817.887
Iteration 4, inertia 109816.446
Iteration 5, inertia 109815.478
Iteration 6, inertia 109814.228
Iteration 7, inertia 109813.943
Converged at iteration 7: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 142233.000
Iteration 1, inertia 104288.696
Iteration 2, inertia 103890.235
Iteration 3, inertia 103828.405
Iteration 4, inertia 103749.099
Iteration 5, inertia 103470.682
Iteration 6, inertia 103289.181
Iteration 7, inertia 103203.534
Iteration 8, inertia 103167.072

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Iteration 9, inertia 103155.946
Converged at iteration 9: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 123213.000
Iteration 1, inertia 108596.363
Iteration 2, inertia 108319.660
Iteration 3, inertia 107770.752
Iteration 4, inertia 107179.345
Iteration 5, inertia 106935.386
Iteration 6, inertia 106875.886
Iteration 7, inertia 106593.663
Iteration 8, inertia 106416.946
Iteration 9, inertia 106347.497
Iteration 10, inertia 106333.440
Iteration 11, inertia 106333.257
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 122231.000
Iteration 1, inertia 108521.864
Iteration 2, inertia 108270.068
Iteration 3, inertia 108255.035
Iteration 4, inertia 108191.547
Iteration 5, inertia 108077.084
Iteration 6, inertia 108023.863
Iteration 7, inertia 107824.520
Iteration 8, inertia 107736.504
Iteration 9, inertia 107373.551
Iteration 10, inertia 107297.649
Iteration 11, inertia 107297.504
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 134331.000
Iteration 1, inertia 104368.908
Iteration 2, inertia 104045.419
Iteration 3, inertia 103744.658
Iteration 4, inertia 103656.340
Iteration 5, inertia 103594.702
Iteration 6, inertia 103477.295
Iteration 7, inertia 103300.604
Iteration 8, inertia 103253.500
Iteration 9, inertia 103250.683
Iteration 10, inertia 103249.570
Iteration 11, inertia 103247.362
Iteration 12, inertia 103232.034
Iteration 13, inertia 103209.396

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Iteration 14, inertia 103209.267
Iteration 15, inertia 103209.246
Converged at iteration 15: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 121918.000
Iteration 1, inertia 107589.364
Iteration 2, inertia 106839.162
Iteration 3, inertia 106697.812
Iteration 4, inertia 106686.600
Iteration 5, inertia 106675.654
Iteration 6, inertia 106653.263
Iteration 7, inertia 106642.499
Iteration 8, inertia 106631.159
Iteration 9, inertia 106477.051
Iteration 10, inertia 106444.968
Iteration 11, inertia 106443.938
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 122204.000
Iteration 1, inertia 108330.549
Iteration 2, inertia 108131.157
Iteration 3, inertia 107763.408
Iteration 4, inertia 107753.604
Iteration 5, inertia 107752.603
Iteration 6, inertia 107749.879
Iteration 7, inertia 107749.606
Converged at iteration 7: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 122140.000
Iteration 1, inertia 108478.415
Iteration 2, inertia 108228.021
Iteration 3, inertia 107634.832
Iteration 4, inertia 107418.338
Iteration 5, inertia 107355.545
Iteration 6, inertia 107321.413
Iteration 7, inertia 107318.039
Converged at iteration 7: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 132808.000
Iteration 1, inertia 108204.172
Iteration 2, inertia 107395.576
Iteration 3, inertia 106808.720
Iteration 4, inertia 106031.059
Iteration 5, inertia 105676.460

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Iteration 6, inertia 105660.343
Iteration 7, inertia 105647.397
Iteration 8, inertia 105572.017
Iteration 9, inertia 105555.603
Iteration 10, inertia 105550.680
Iteration 11, inertia 105550.605
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 114871.000
Iteration 1, inertia 107899.649
Iteration 2, inertia 106791.238
Iteration 3, inertia 106316.372
Iteration 4, inertia 106026.593
Iteration 5, inertia 105825.385
Iteration 6, inertia 105767.199
Iteration 7, inertia 105766.357
Iteration 8, inertia 105764.484
Iteration 9, inertia 105764.092
Converged at iteration 9: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 133037.000
Iteration 1, inertia 109352.234
Iteration 2, inertia 109235.424
Iteration 3, inertia 109214.975
Iteration 4, inertia 109211.969
Iteration 5, inertia 109210.849
Iteration 6, inertia 109209.601
Iteration 7, inertia 109209.317
Converged at iteration 7: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 141802.000
Iteration 1, inertia 104023.569
Iteration 2, inertia 103621.746
Iteration 3, inertia 103559.010
Iteration 4, inertia 103473.728
Iteration 5, inertia 103159.739
Iteration 6, inertia 102946.623
Iteration 7, inertia 102887.100
Iteration 8, inertia 102887.008
Converged at iteration 8: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 122862.000
Iteration 1, inertia 108383.339
Iteration 2, inertia 107944.386

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Iteration 3, inertia 107596.599
Iteration 4, inertia 107028.365
Iteration 5, inertia 106915.055
Iteration 6, inertia 106860.908
Iteration 7, inertia 106679.395
Iteration 8, inertia 106424.659
Iteration 9, inertia 106408.012
Iteration 10, inertia 106357.969
Iteration 11, inertia 106318.105
Iteration 12, inertia 106317.841
Converged at iteration 12: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 122107.000
Iteration 1, inertia 108411.801
Iteration 2, inertia 108160.040
Iteration 3, inertia 108145.010
Iteration 4, inertia 108081.555
Iteration 5, inertia 107967.112
Iteration 6, inertia 107913.947
Iteration 7, inertia 107714.632
Iteration 8, inertia 107626.813
Iteration 9, inertia 107263.752
Iteration 10, inertia 107187.831
Iteration 11, inertia 107187.686
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 133895.000
Iteration 1, inertia 104077.745
Iteration 2, inertia 103738.937
Iteration 3, inertia 103400.269
Iteration 4, inertia 103297.973
Iteration 5, inertia 103256.378
Iteration 6, inertia 103144.299
Iteration 7, inertia 102975.808
Iteration 8, inertia 102917.873
Iteration 9, inertia 102914.012
Iteration 10, inertia 102912.455
Iteration 11, inertia 102906.426
Iteration 12, inertia 102886.085
Iteration 13, inertia 102873.127
Iteration 14, inertia 102873.027
Iteration 15, inertia 102873.007
Converged at iteration 15: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 121758.000

```



```

Iteration 1, inertia 107501.992
Iteration 2, inertia 106732.632
Iteration 3, inertia 106589.774
Iteration 4, inertia 106578.565
Iteration 5, inertia 106567.622
Iteration 6, inertia 106545.300
Iteration 7, inertia 106534.570
Iteration 8, inertia 106523.235
Iteration 9, inertia 106369.131
Iteration 10, inertia 106337.048
Iteration 11, inertia 106336.018
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 122028.000
Iteration 1, inertia 108198.560
Iteration 2, inertia 107999.047
Iteration 3, inertia 107631.427
Iteration 4, inertia 107621.623
Iteration 5, inertia 107620.621
Iteration 6, inertia 107617.897
Iteration 7, inertia 107617.624
Converged at iteration 7: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 122044.000
Iteration 1, inertia 108391.842
Iteration 2, inertia 108141.387
Iteration 3, inertia 107546.734
Iteration 4, inertia 107331.756
Iteration 5, inertia 107269.358
Iteration 6, inertia 107234.889
Iteration 7, inertia 107231.514
Converged at iteration 7: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 132744.000
Iteration 1, inertia 107934.344
Iteration 2, inertia 107149.649
Iteration 3, inertia 106624.857
Iteration 4, inertia 105852.612
Iteration 5, inertia 105504.326
Iteration 6, inertia 105492.258
Iteration 7, inertia 105491.912
Iteration 8, inertia 105491.791
Converged at iteration 8: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete

```

```

Iteration 0, inertia 114731.000
Iteration 1, inertia 107766.731
Iteration 2, inertia 106658.458
Iteration 3, inertia 106183.949
Iteration 4, inertia 105894.408
Iteration 5, inertia 105692.641
Iteration 6, inertia 105634.445
Iteration 7, inertia 105633.602
Iteration 8, inertia 105631.729
Iteration 9, inertia 105631.338
Converged at iteration 9: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 132669.000
Iteration 1, inertia 109072.867
Iteration 2, inertia 108956.088
Iteration 3, inertia 108935.648
Iteration 4, inertia 108932.644
Iteration 5, inertia 108931.519
Iteration 6, inertia 108930.269
Iteration 7, inertia 108929.985
Converged at iteration 7: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 141336.000
Iteration 1, inertia 103650.842
Iteration 2, inertia 103248.012
Iteration 3, inertia 103185.502
Iteration 4, inertia 103100.210
Iteration 5, inertia 102786.514
Iteration 6, inertia 102573.332
Iteration 7, inertia 102513.808
Iteration 8, inertia 102513.716
Converged at iteration 8: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 122566.000
Iteration 1, inertia 108122.521
Iteration 2, inertia 107683.338
Iteration 3, inertia 107335.060
Iteration 4, inertia 106766.833
Iteration 5, inertia 106654.695
Iteration 6, inertia 106599.282
Iteration 7, inertia 106417.004
Iteration 8, inertia 106164.027
Iteration 9, inertia 106147.069
Iteration 10, inertia 106096.964
Iteration 11, inertia 106057.080

```

```

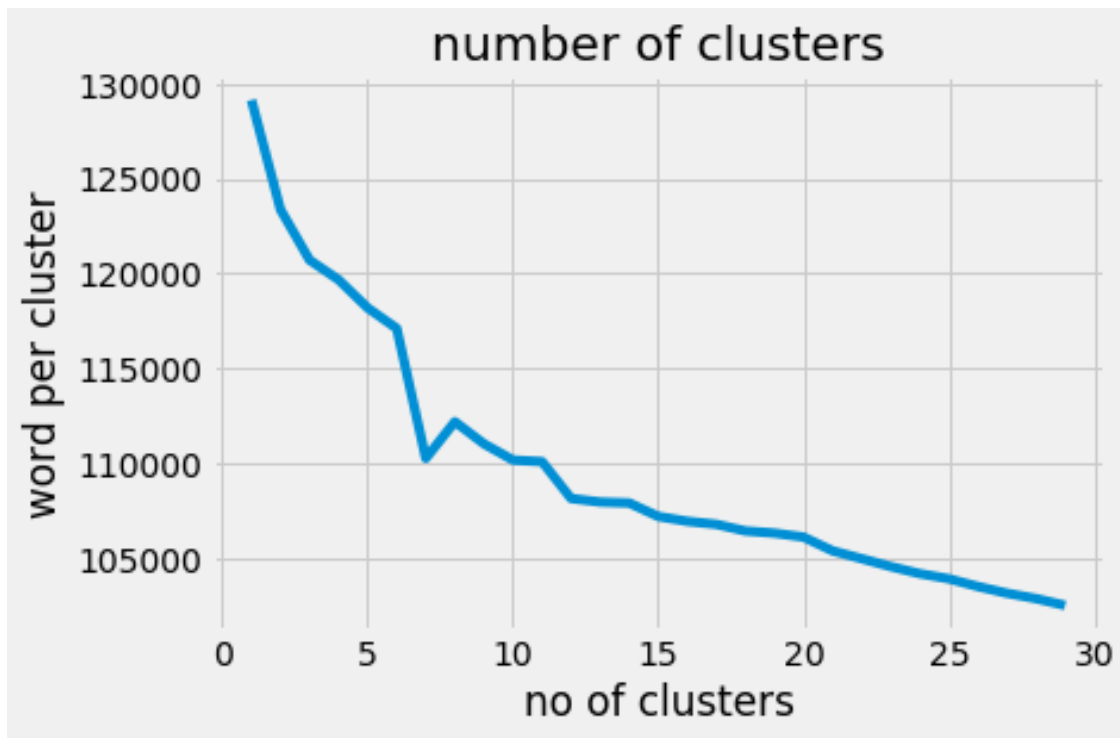
Iteration 12, inertia 106056.816
Converged at iteration 12: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 122059.000
Iteration 1, inertia 108368.749
Iteration 2, inertia 108117.000
Iteration 3, inertia 108101.971
Iteration 4, inertia 108038.530
Iteration 5, inertia 107924.096
Iteration 6, inertia 107870.954
Iteration 7, inertia 107671.650
Iteration 8, inertia 107583.916
Iteration 9, inertia 107220.813
Iteration 10, inertia 107144.885
Iteration 11, inertia 107144.740
Converged at iteration 11: center shift 0.000000e+00 within tolerance
1.071728e-07
Initialization complete
Iteration 0, inertia 133789.000
Iteration 1, inertia 103982.872
Iteration 2, inertia 103644.182
Iteration 3, inertia 103305.476
Iteration 4, inertia 103203.176
Iteration 5, inertia 103161.579
Iteration 6, inertia 103049.555
Iteration 7, inertia 102881.102
Iteration 8, inertia 102823.151
Iteration 9, inertia 102819.290
Iteration 10, inertia 102817.732
Iteration 11, inertia 102811.703
Iteration 12, inertia 102791.361
Iteration 13, inertia 102778.402
Iteration 14, inertia 102778.302
Iteration 15, inertia 102778.282
Converged at iteration 15: center shift 0.000000e+00 within tolerance
1.071728e-07

```

```

[66]: plt.plot(range(1,30),nb)
      plt.title('number of clusters')
      plt.xlabel('no of clusters')
      plt.ylabel('word per cluster')
      plt.show()

```



```
[67]: true_k=30
Kmeans=KMeans(n_clusters=true_k,init='k-means++',n_init=1)
Kmeans.fit(X)
```

```
[67]: KMeans(algorithm='auto', copy_x=True, init='k-means++', max_iter=300,
            n_clusters=30, n_init=1, n_jobs=None, precompute_distances='auto',
            random_state=None, tol=0.0001, verbose=0)
```

```
[68]: print("Top terms per cluster:")
order_centroids = Kmeans.cluster_centers_.argsort()[:, :-1]
terms = cv.get_feature_names()
for i in range(true_k):
    print("Cluster %d:" % i)
    for ind in order_centroids[i, :10]:
        print(' %s' % terms[ind])
    print()
print("\n")
```

Top terms per cluster:

Cluster 0:

school
high
footbal
texa

fall
commun
he
live
season
covid

Cluster 1:

action
millwal
act
boo
colchest
fa
gpa
take
lb
player

Cluster 2:

then
the
me
fantasi
keenan
allen
catch
sit
ball
and

Cluster 3:

footbal
play
team
the
colleg
get
year
watch
coach
club

Cluster 4:

social
last
experi
creat

arsen
convinc
im
see
govern
decad

Cluster 5:

game
york
new
attend
safe
scientist
footbal
long
break
determin

Cluster 6:

alway
tri
win
want
even
everyon
respect
compet
messi
footbal

Cluster 7:

join
leagu
club
and
champion
sinc
never
drop
what
joi

Cluster 8:

job
achiev
manag
there

hope
footbal
man
got
us
use

Cluster 9:

dame
notr
kelli
brian
footbal
colleg
playoff
famili
if
attend

Cluster 10:

teko
modis
mid
psl
mamelodi
themba
longstand
equal
record
zwane

Cluster 11:

colleg
throw
justin
qb
field
accur
footbal
yard
most
footballth

Cluster 12:

final
jerki
beef
championship

mvp
state
harri
orthopaed
uk
paintsvil

Cluster 13:

big
confer
fallwint
cross
footbal
no
opt
covid
presid
sport

Cluster 14:

mean
rule
opportun
washington
now
team
nfl
footbal
smith
dwayn

Cluster 15:

game
footbal
it
championship
play
the
state
vs
colleg
one

Cluster 16:

alex
smith
washington
rule

dwayn
qb
calf
hasikin
football
team

Cluster 17:

prove
come
he
lfc
far
tomorrow
face
palac
alexanderarnold
crystal

Cluster 18:

devast
incred
work
guy
point
still
grayson
get
were
hard

Cluster 19:

keep
togeth
cartoon
men
children
football
women
forbid
for
footyquot

Cluster 20:

the
play
team
player

best
he
season
get
it
week

Cluster 21:

jan
football
high
michigan
playoff
school
begin
practic
monday
restart

Cluster 22:

aaron
russel
rodger
nfl
wilson
qb
right
desha
top
mahom

Cluster 23:

practic
look
playoff
the
back
state
like
football
monday
final

Cluster 24:

player
football
colleg
play

best
one
ever
overwhelmingli
the
fan

Cluster 25:

game
window
sunday
night
earli
come
schedul
footbal
tomorrow
late

Cluster 26:

want
enjoy
he
solskjaer
play
boy
pogba
footbal
success
see

Cluster 27:

leagu
premier
week
cup
seri
action
laliga
dstv
premiership
carabao

Cluster 28:

colleg
footbal
playoff
for

belt
in
just
champion
name
espn

Cluster 29:

truli
think
miss
fan
behalf
talk
hazard
footbal
say
eden

```
[69]: result_final_data_analysis = pd.DataFrame(columns = ['tweet'])
i=0
j=0
while i<30:
    while True:
        Y=cv.transform([stemmed_dataset[j]])
        prediction=Kmeans.predict(Y)
        if i == prediction:
            print("tweet of cluster "+str(prediction)+data_analysis.
↪loc[j,"Tweet_punct"])
            result_final_data_analysis.loc[i,"tweet"] =data_analysis.
↪loc[j,"Tweet_punct"]
            j=0
            break
        j+=1
    i+=1
result_final_data_analysis.to_csv('result_final_data_analysis.csv',index =_
↪False )
```

tweet of cluster [0]Carthage has to have the best stretch of a powerhouse
program in the history of Texas high school football Surratt created a monster
tweet of cluster [1] Temple LB Isaiah GrahamMobley has transferred to Boston
College Another big get for Jeff Hafley and his transforming
tweet of cluster [2] Keenan Allen Yelling DONT SIT ME To Fantasy Football Owners
Before The Game And Then Catching Ball Should Be A Cri
tweet of cluster [3]The Monett football team had four athletes secure five spots

on the AllDistrict football team
tweet of cluster [4] Im convinced that Arsenal have been in a social experiment
for the last decade which was created by the government to see
tweet of cluster [5] BREAKING New York scientists have determined it is safe to
attend football games as long as they are playoff games Reg
tweet of cluster [6] Lionel Messi I always try to respect everyone on the
football pitch even if I always want to win and to compete
tweet of cluster [7] And its never dropped below in the Champions League
since he joined the club

Join

tweet of cluster [8] A man got a job using his Football Manager achievements
There is hope for all of us
tweet of cluster [9]Such a jerkNotre Dame coach Brian Kelly threatens to opt out
of the College Football Playoff if players familie
tweet of cluster [10]Themba Zwane will equal my longstanding PSL record Teko
Modise
Teko Modise has backed Mamelodi Sundowns star mid
tweet of cluster [11]College Justin Fields Most accurate QB on yard throws in
all of college football
tweet of cluster [12] UK Orthopaedics State Football Finals A Championship
Mingua Beef Jerky MVP Award Harris Phelps Paintsville

tweet of cluster [13]JoeD Big Conference presidents voted to opt out of
fallwinter sports COVID concerns
No football hoops cross country gol
tweet of cluster [14] From NFL Now Washington Football Team has ruled out Alex
Smith which means a huge opportunity for QB Dwayne Haskins looms
tweet of cluster [15]Used to play ballin like Im Kobe before every football game
in on spinrilla
tweet of cluster [16] Washington ruled out QB Alex Smith calf for Sundays game
vs Seattle Dwayne Haskins will start for the firstplace
tweet of cluster [17] Trent AlexanderArnold can prove how far hes come as LFC
face Crystal Palace tomorrow

tweet of cluster [18]Grayson Devastated for all the seniors and all our guys
that worked so incredibly hard to get to this point Were still here
tweet of cluster [19] Football keeps men together cartoon keeps children
together what keeps women together
tweet of cluster [20] So proud of our OU Moms

Thank you ladies for raising amazing sons and giving back to our local community
in such a

tweet of cluster [21] Jan HS Football in MI Thoughts

Michigan high school football playoffs to restart Jan practice begins Monday
tweet of cluster [22] s list of the top QBs in the NFL right now

Patrick Mahomes
 Aaron Rodgers
 Russell Wilson
 Desha

tweet of cluster [23] The football state playoffs are back on Practice begins Monday and it looks like the regional finals will be Jan <https>

tweet of cluster [24]Us female ftball players wanted year

The team is looking for a defender amp versatile players either wi

tweet of cluster [25] Football schedule coming up

games tomorrow night
 games in early window Sunday
 games in late window Sunday

tweet of cluster [26] Solskjaer on Pogba He wants to play he wants to train he enjoys football he wants success I see a boy who enjoys

tweet of cluster [27] With Premier League DStv Premiership LaLiga Serie A and Carabao Cup action this week the festive footbal

tweet of cluster [28] JUST IN FROM ESPN For College Football Playoff purposes will be named Sun Belt Champions

tweet of cluster [29]Raf I think I talk on behalf of all football fans when I say we all truly miss Eden Hazard

3.9 Conclusion :

on a charger les tweets appartir de l'api de twitter, on les a mis dans le fichier csv data_analysis. puis on a fait le data cleaning et on a mis le resultat dans le fichier cleaning_data_analysis.csv. par la suite en utilisant différents classificateurs NLTK, il était plus facile de classer les tweets et puis on a améliorer l'ensemble de données d'entraînement, Et enfin on a mis un tweet de chaque cluster dans le fichier result_final_data_analysis et nous pouvons obtenir un résultat précis.