

ESCUELA POLITÉCNICA NACIONAL

REDES NEURONALES

TAREA 9

(PARTE 1: Datasets 6 a 8)

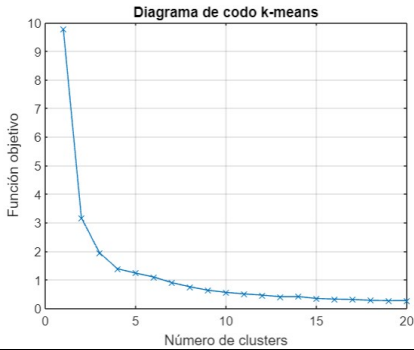
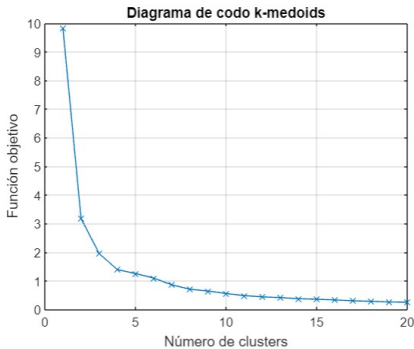


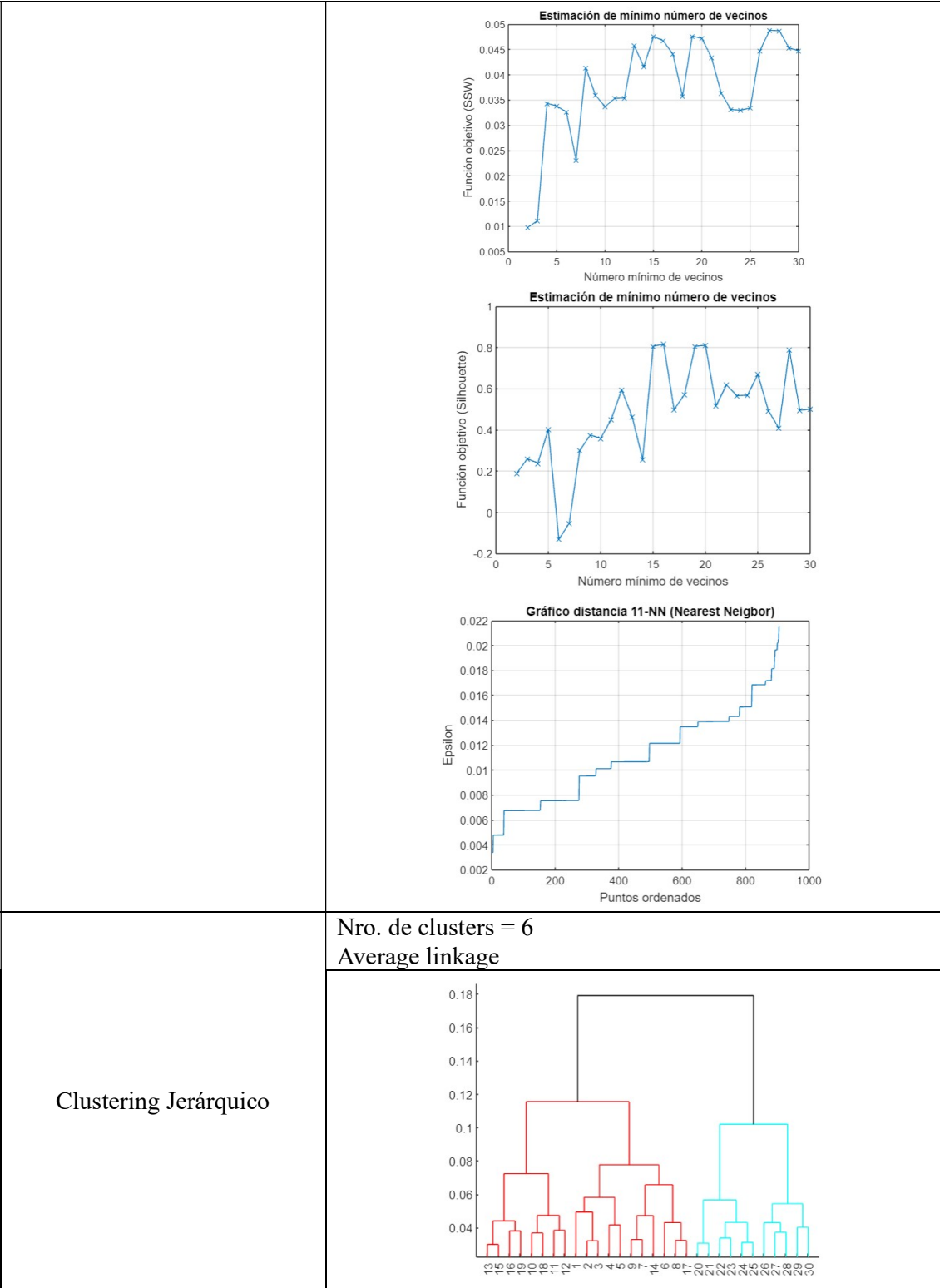
David Fabián Cevallos Salas

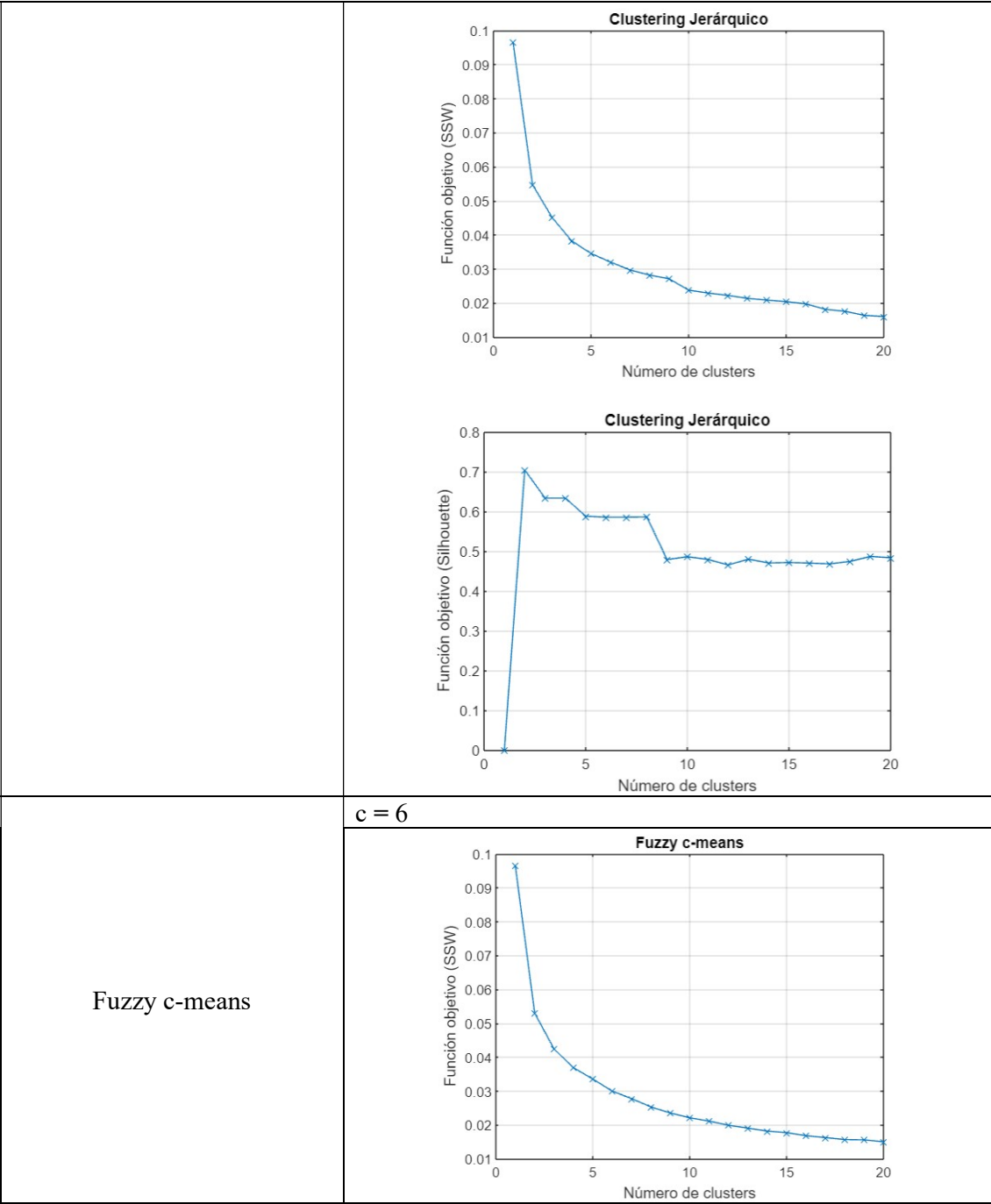
2023-08-29

6. Dataset Ds3c3sc6

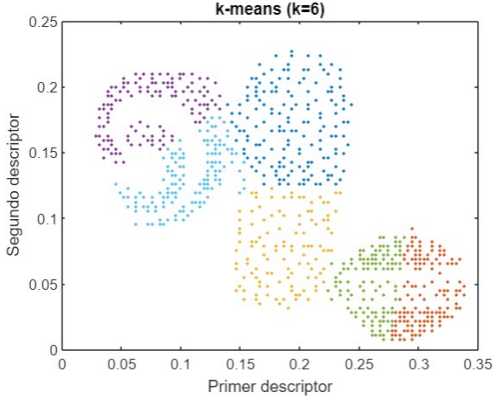
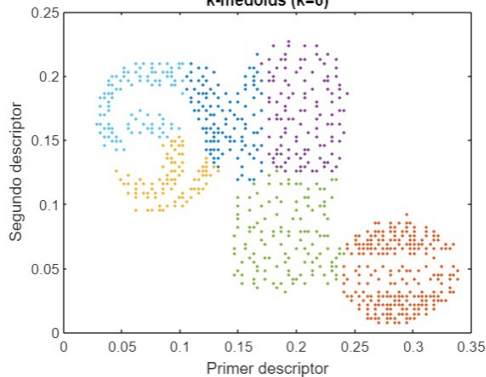
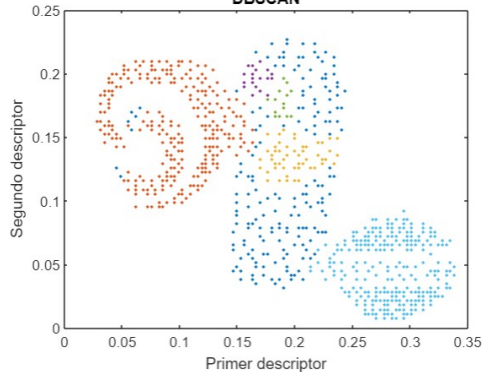
6.1 Estimación de parámetros

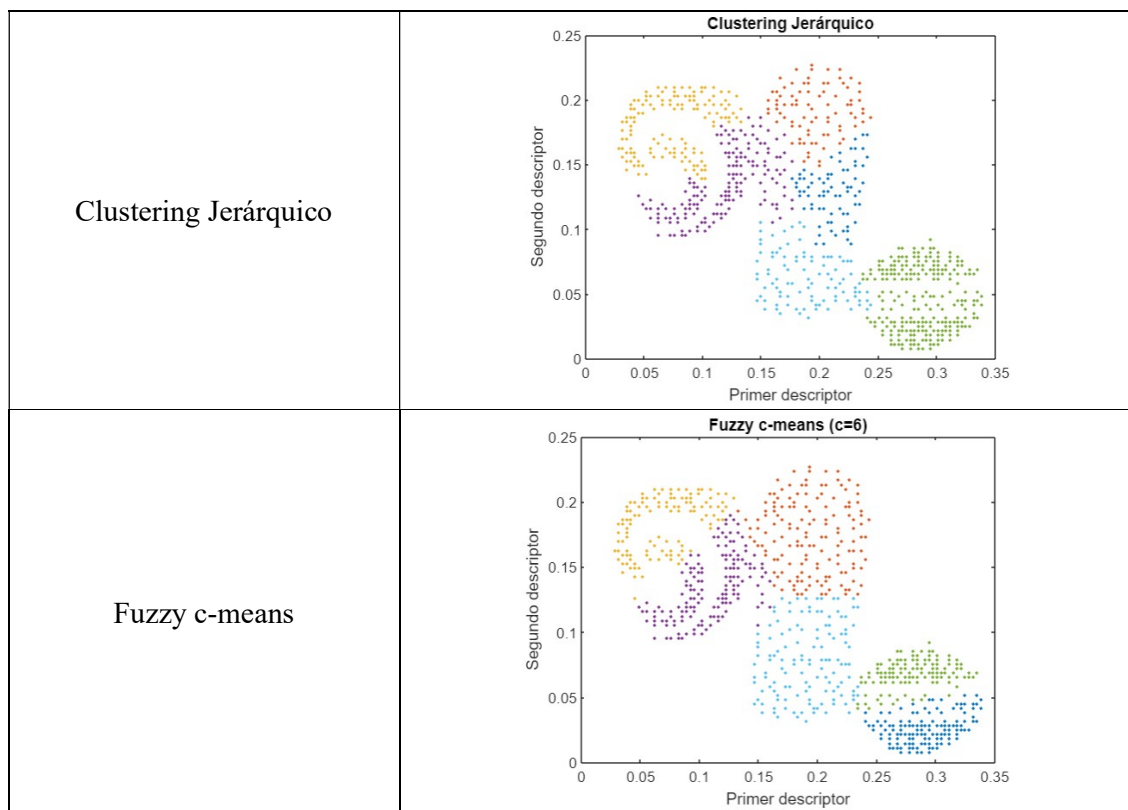
Algoritmo	Estimación de parámetros
k-means	k = 6
	
k-medoids	k = 6
	
DBSCAN	Mínimo Nro. de vecinos = 12 epsilon = 0,0122





6.2 Visualización de clusters

Algoritmo	Visualización de clusters
k-means	
k-medoids	
DBSCAN	 <p>(5 clústeres en total más un cluster de anomalías) (182 observaciones anómalas)</p>

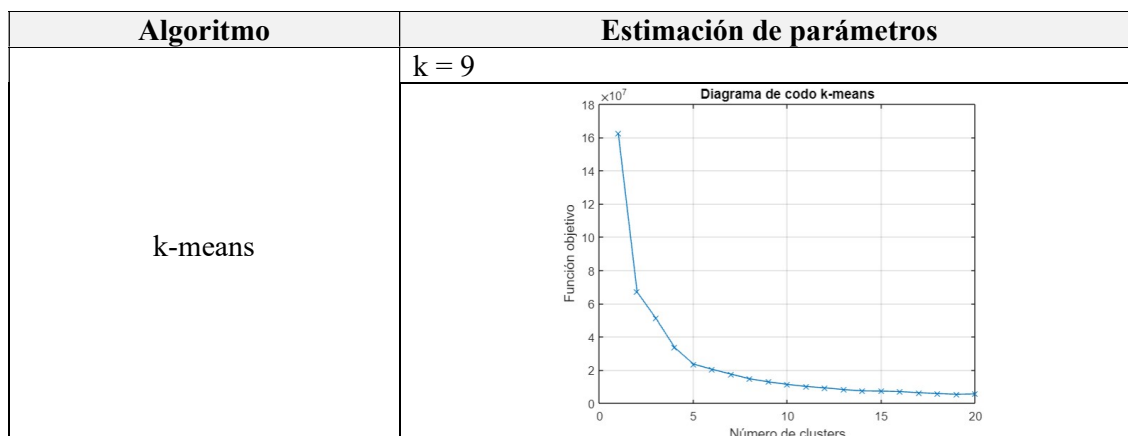


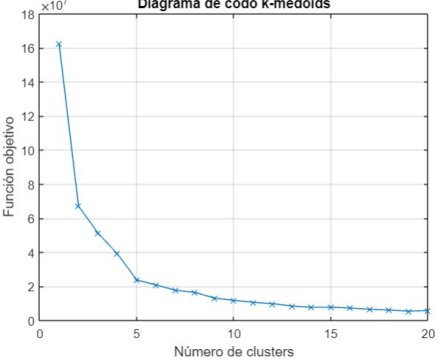
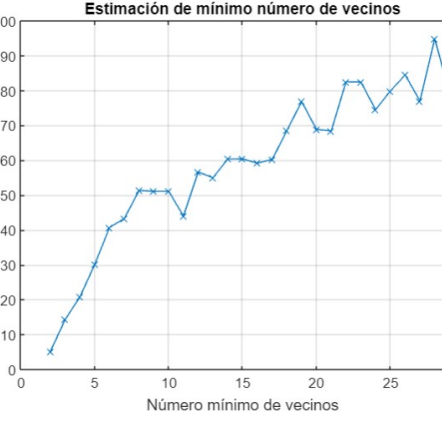
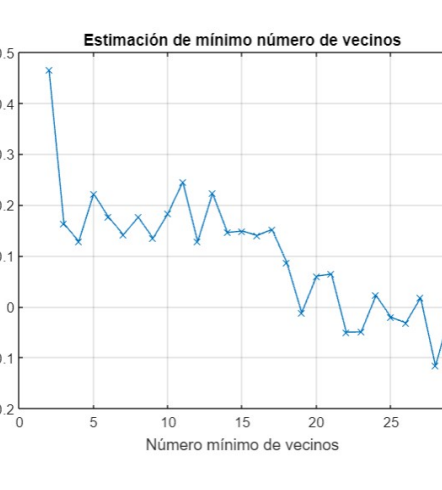
6.3 Métricas

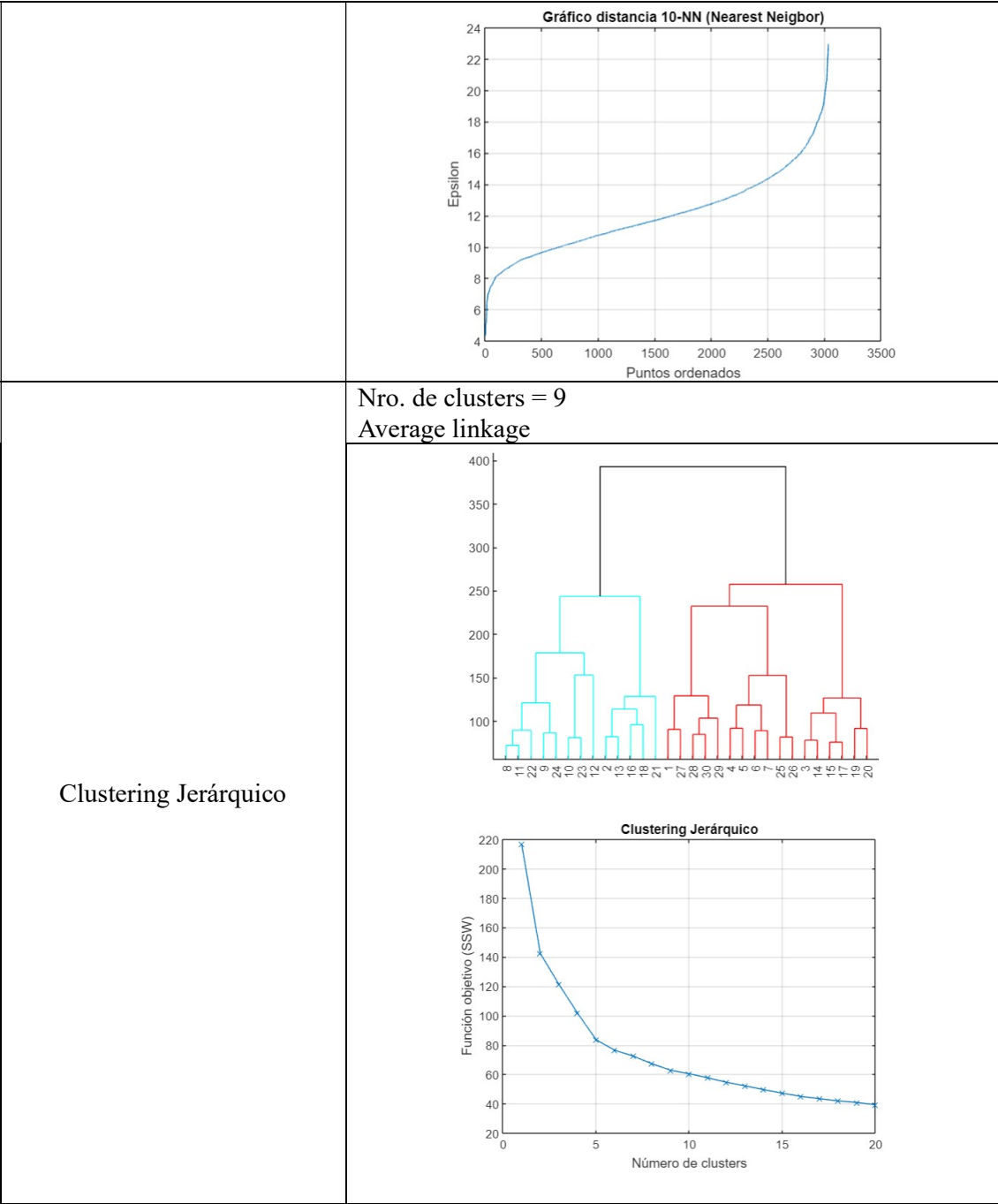
	k-means	k-medoids	DBSCAN	Clustering Jerárquico	Fuzzy c-means
SSW	0,0307	0,0308	0,0354	0,0320	0,0299
SSB	0,0922	0,0927	0,1014	0,0924	0,0920
WB-index	1,9949	1,9896	1,7432	2,0761	1,9534
Silhouette	0,5302	0,6343	0,5936	0,5851	0,5534

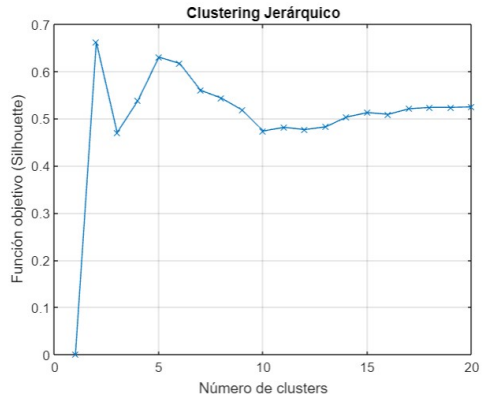
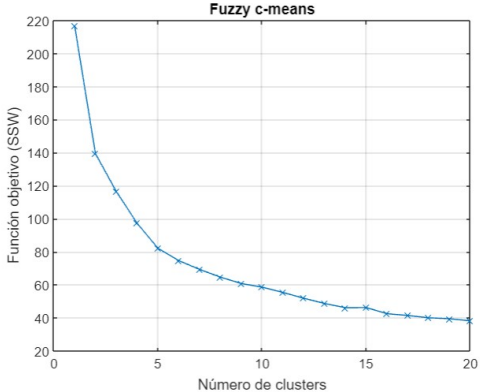
7. Dataset Complex9

7.1 Estimación de parámetros

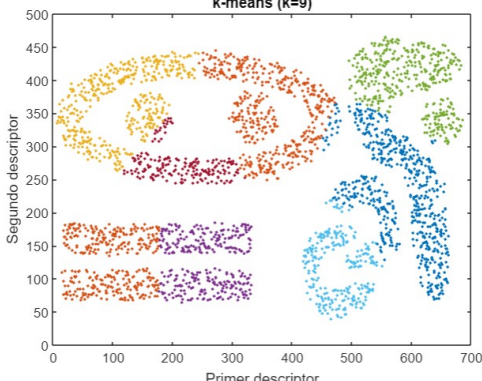


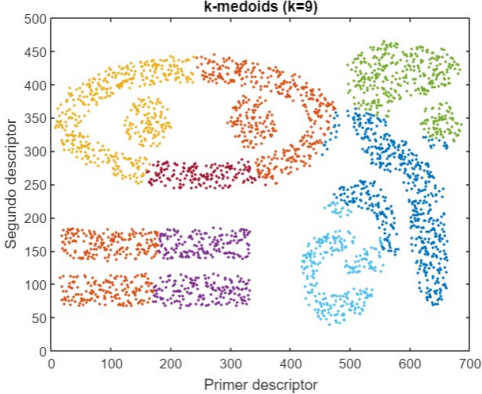
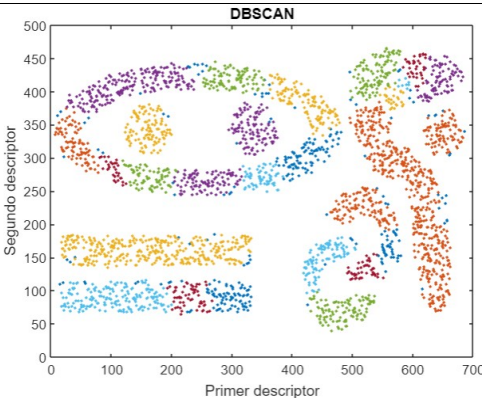
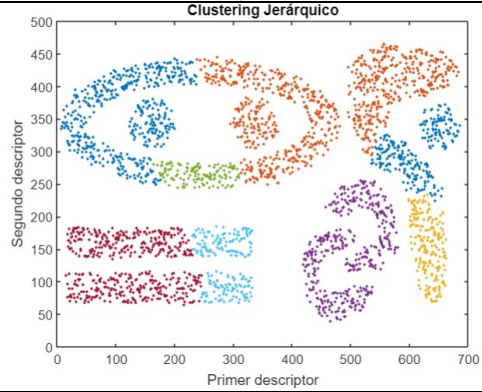
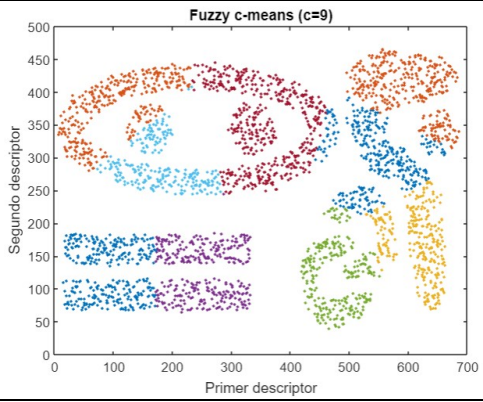
k-medoids	<div data-bbox="636 178 1372 220">k = 9</div> <div data-bbox="755 220 1258 579"><p>Diagrama de codo k-medoids</p><table border="1"><caption>Data for Diagrama de codo k-medoids</caption><thead><tr><th>Número de clusters</th><th>Función objetivo ($\times 10^7$)</th></tr></thead><tbody><tr><td>1</td><td>16.5</td></tr><tr><td>2</td><td>6.5</td></tr><tr><td>3</td><td>5.5</td></tr><tr><td>4</td><td>4.5</td></tr><tr><td>5</td><td>2.5</td></tr><tr><td>6</td><td>2.2</td></tr><tr><td>7</td><td>2.0</td></tr><tr><td>8</td><td>1.8</td></tr><tr><td>9</td><td>1.6</td></tr><tr><td>10</td><td>1.5</td></tr><tr><td>11</td><td>1.4</td></tr><tr><td>12</td><td>1.3</td></tr><tr><td>13</td><td>1.2</td></tr><tr><td>14</td><td>1.1</td></tr><tr><td>15</td><td>1.0</td></tr><tr><td>16</td><td>1.0</td></tr><tr><td>17</td><td>1.0</td></tr><tr><td>18</td><td>1.0</td></tr><tr><td>19</td><td>1.0</td></tr><tr><td>20</td><td>1.0</td></tr></tbody></table></div>	Número de clusters	Función objetivo ($\times 10^7$)	1	16.5	2	6.5	3	5.5	4	4.5	5	2.5	6	2.2	7	2.0	8	1.8	9	1.6	10	1.5	11	1.4	12	1.3	13	1.2	14	1.1	15	1.0	16	1.0	17	1.0	18	1.0	19	1.0	20	1.0																																																																														
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DBSCAN	<div data-bbox="636 579 1372 661"><p>Mínimo Nro. de vecinos = 11 epsilon = 13,4544</p></div> <div data-bbox="755 661 1258 1081"><p>Estimación de mínimo número de vecinos</p><table border="1"><caption>Data for Estimación de mínimo número de vecinos (SSW)</caption><thead><tr><th>Número mínimo de vecinos</th><th>Función objetivo (SSW)</th></tr></thead><tbody><tr><td>1</td><td>5</td></tr><tr><td>2</td><td>15</td></tr><tr><td>3</td><td>25</td></tr><tr><td>4</td><td>35</td></tr><tr><td>5</td><td>45</td></tr><tr><td>6</td><td>48</td></tr><tr><td>7</td><td>52</td></tr><tr><td>8</td><td>52</td></tr><tr><td>9</td><td>52</td></tr><tr><td>10</td><td>45</td></tr><tr><td>11</td><td>58</td></tr><tr><td>12</td><td>55</td></tr><tr><td>13</td><td>62</td></tr><tr><td>14</td><td>62</td></tr><tr><td>15</td><td>62</td></tr><tr><td>16</td><td>60</td></tr><tr><td>17</td><td>72</td></tr><tr><td>18</td><td>78</td></tr><tr><td>19</td><td>70</td></tr><tr><td>20</td><td>70</td></tr><tr><td>21</td><td>82</td></tr><tr><td>22</td><td>82</td></tr><tr><td>23</td><td>75</td></tr><tr><td>24</td><td>82</td></tr><tr><td>25</td><td>85</td></tr><tr><td>26</td><td>78</td></tr><tr><td>27</td><td>95</td></tr><tr><td>28</td><td>80</td></tr><tr><td>29</td><td>78</td></tr></tbody></table></div> <div data-bbox="755 1081 1258 1568"><p>Estimación de mínimo número de vecinos</p><table border="1"><caption>Data for Estimación de mínimo número de vecinos (Silhouette)</caption><thead><tr><th>Número mínimo de vecinos</th><th>Función objetivo (Silhouette)</th></tr></thead><tbody><tr><td>1</td><td>0.45</td></tr><tr><td>2</td><td>0.15</td></tr><tr><td>3</td><td>0.12</td></tr><tr><td>4</td><td>0.22</td></tr><tr><td>5</td><td>0.18</td></tr><tr><td>6</td><td>0.15</td></tr><tr><td>7</td><td>0.18</td></tr><tr><td>8</td><td>0.15</td></tr><tr><td>9</td><td>0.18</td></tr><tr><td>10</td><td>0.25</td></tr><tr><td>11</td><td>0.15</td></tr><tr><td>12</td><td>0.22</td></tr><tr><td>13</td><td>0.15</td></tr><tr><td>14</td><td>0.15</td></tr><tr><td>15</td><td>0.15</td></tr><tr><td>16</td><td>0.15</td></tr><tr><td>17</td><td>0.15</td></tr><tr><td>18</td><td>0.08</td></tr><tr><td>19</td><td>-0.02</td></tr><tr><td>20</td><td>0.05</td></tr><tr><td>21</td><td>0.05</td></tr><tr><td>22</td><td>-0.05</td></tr><tr><td>23</td><td>-0.05</td></tr><tr><td>24</td><td>0.02</td></tr><tr><td>25</td><td>-0.02</td></tr><tr><td>26</td><td>-0.02</td></tr><tr><td>27</td><td>0.02</td></tr><tr><td>28</td><td>-0.12</td></tr><tr><td>29</td><td>-0.02</td></tr></tbody></table></div>	Número mínimo de vecinos	Función objetivo (SSW)	1	5	2	15	3	25	4	35	5	45	6	48	7	52	8	52	9	52	10	45	11	58	12	55	13	62	14	62	15	62	16	60	17	72	18	78	19	70	20	70	21	82	22	82	23	75	24	82	25	85	26	78	27	95	28	80	29	78	Número mínimo de vecinos	Función objetivo (Silhouette)	1	0.45	2	0.15	3	0.12	4	0.22	5	0.18	6	0.15	7	0.18	8	0.15	9	0.18	10	0.25	11	0.15	12	0.22	13	0.15	14	0.15	15	0.15	16	0.15	17	0.15	18	0.08	19	-0.02	20	0.05	21	0.05	22	-0.05	23	-0.05	24	0.02	25	-0.02	26	-0.02	27	0.02	28	-0.12	29	-0.02
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Fuzzy c-means	<p>c = 9</p> 

7.2 Visualización de clusters

Algoritmo	Visualización de clusters
k-means	

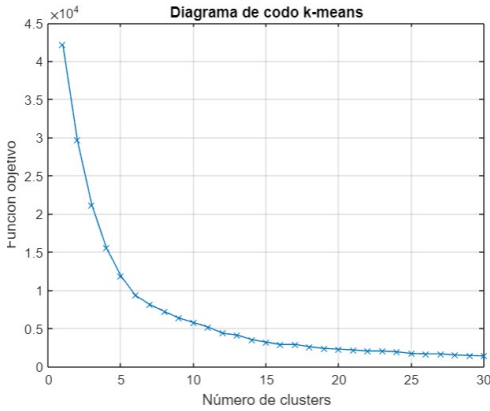
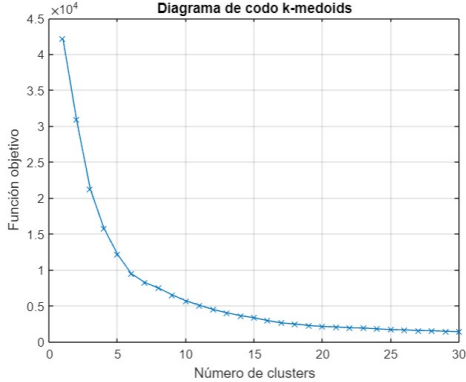
<p>k-medoids</p>	
<p>DBSCAN</p>	 <p>(27 clústeres en total más un cluster de anomalías) (113 observaciones anómalas)</p>
<p>Clustering Jerárquico</p>	
<p>Fuzzy c-means</p>	

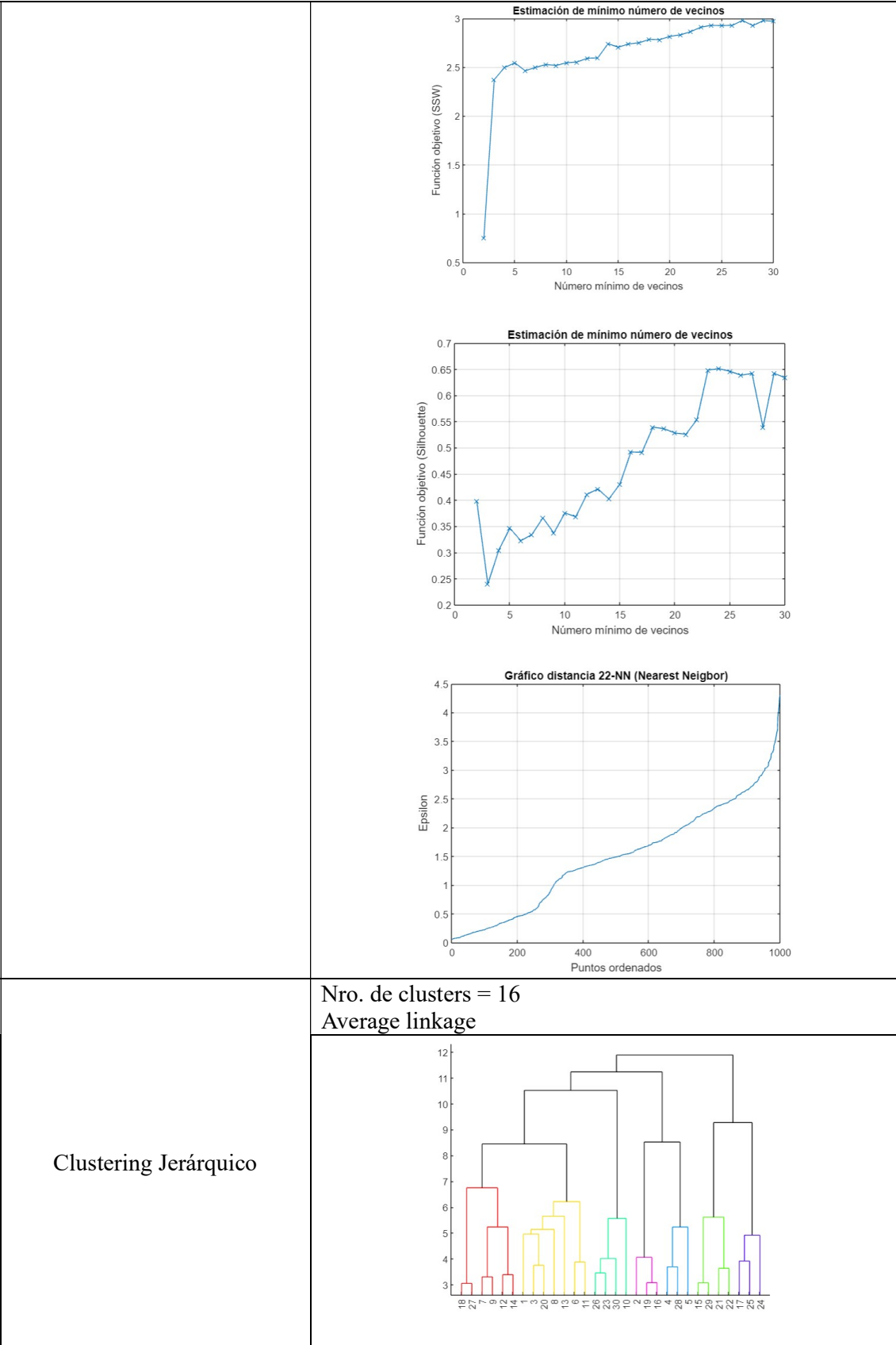
7.3 Métricas

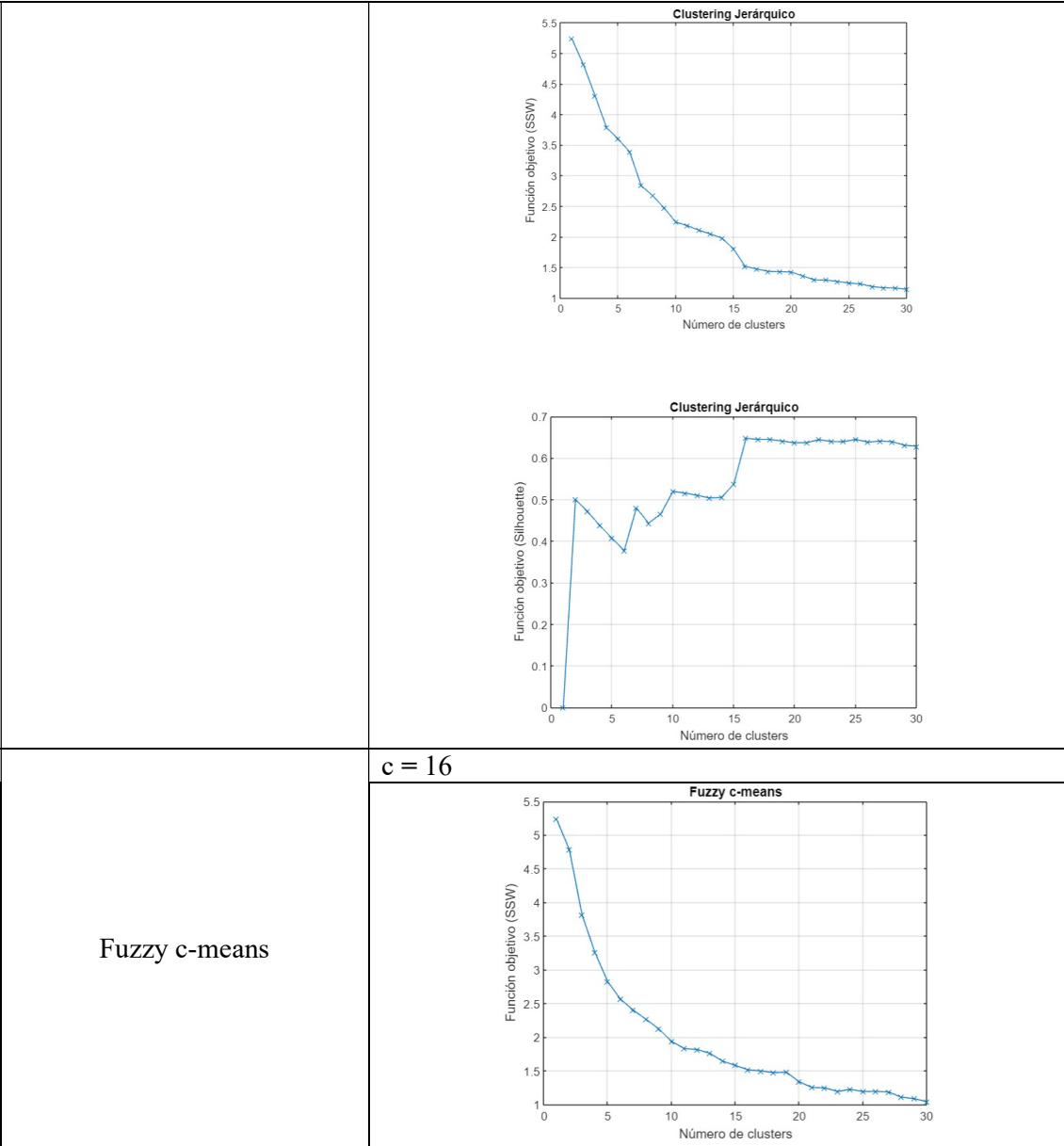
	k-means	k-medoids	DBSCAN	Clustering Jerárquico	Fuzzy c-means
SSW	60,4643	60,5320	43,9858	62,7905	60,4357
SSB	210,8405	210,8772	213,1166	210,0179	210,4528
WB-index	2,5810	2,5834	5,5726	2,6908	2,5845
Silhouette	0,5861	0,5831	0,2452	0,5179	0,5785

8. Dataset Rings

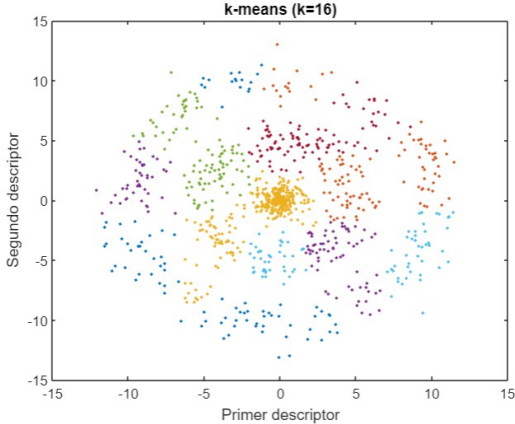
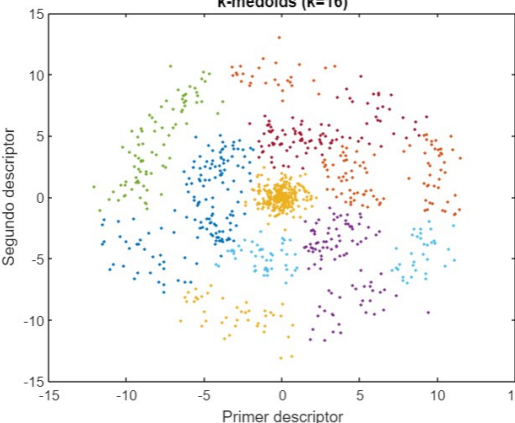
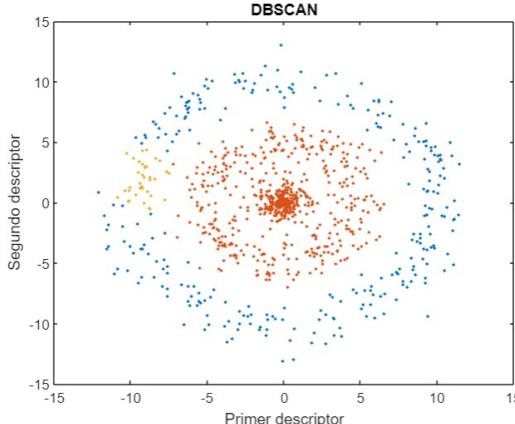
8.1 Estimación de parámetros

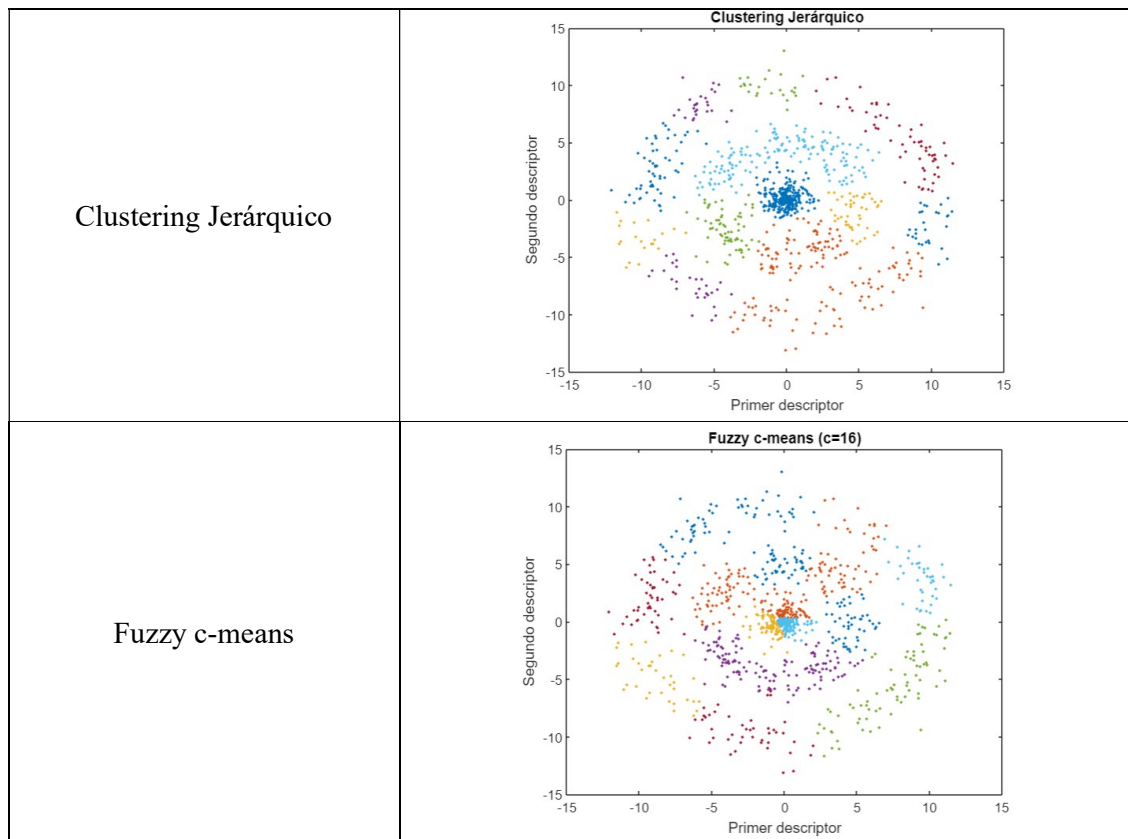
Algoritmo	Estimación de parámetros
k-means	k = 16
	 <p>Diagrama de codo k-means</p>
k-medoids	k = 16
	 <p>Diagrama de codo k-medoids</p>
DBSCAN	Mínimo Nro. de vecinos = 23 epsilon = 1,7702





8.2 Visualización de clusters

Algoritmo	Visualización de clusters
k-means	
k-medoids	
DBSCAN	 <p>(2 clústeres en total más un cluster de anomalías) (280 observaciones anómalas)</p>



8.3 Métricas

	k-means	k-medoids	DBSCAN	Clustering Jerárquico	Fuzzy c-means
SSW	1,5138	1,4227	2,9111	1,5165	1,4939
SSB	4,8630	4,8784	0,8809	4,8486	5,0273
WB-index	4,9807	4,6661	6,6095	5,0043	4,7546
Silhouette	0,6476	0,6948	0,6484	0,6471	0,5016