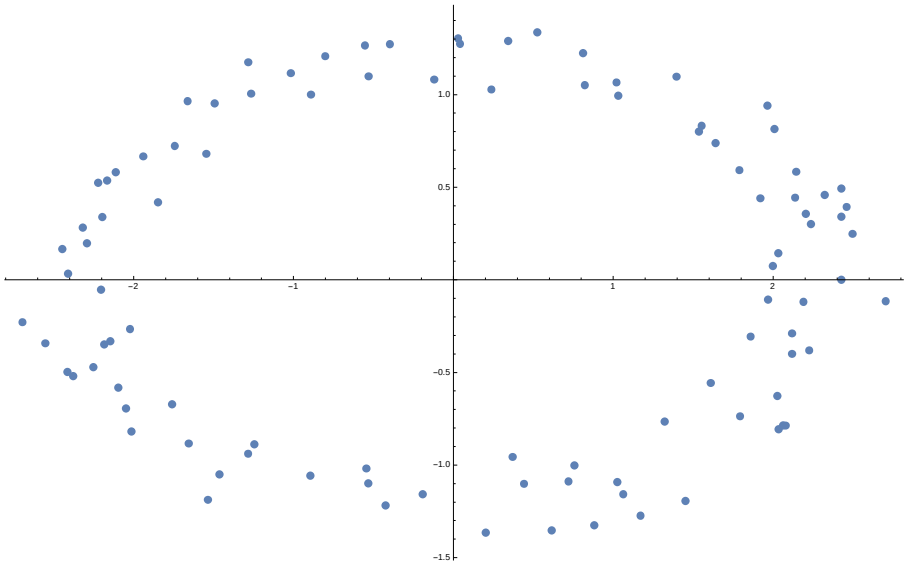
```
n = 100;
points = Table[{(2 (1 + 0.4 RandomReal[]) Cos[t (1 + 0.1 RandomReal[])]), (1 (1 + 0.4 RandomReal[]) Sin[t (1 + 0.1 RandomReal[])])}, {t, 0, 2 Pi - 2 Pi/n, 2 Pi/n}] // N;
p1 = ListPlot[points]
```




```
x2 = Table[points[[i, 1]] * points[[i, 1]], {i, n}];
y2 = Table[points[[i, 2]] * points[[i, 2]], {i, n}];
xy = Table[points[[i, 1]] * points[[i, 2]], {i, n}];
x = Table[points[[i, 1]], {i, n}];
y = Table[points[[i, 2]], {i, n}];
ones = Table[1, {i, n}];
zeros = Table[0, {i, n}];
a = Transpose[{x2, y2, xy, x, y}];
```

```
MatrixForm[a]
```

5.88798	0.	0.	2.42652	0.
3.9923	0.00562704	0.149883	1.99808	0.0750136
4.12853	0.0207128	0.292427	2.03188	0.14392
6.23556	0.0616364	0.61995	2.49711	0.248267
5.0042	0.0908557	0.674285	2.23701	0.301423
4.56929	0.196841	0.94838	2.13759	0.443668
3.68469	0.193938	0.845342	1.91955	0.440384
5.39324	0.209769	1.06364	2.32234	0.458005
3.20058	0.350596	1.0593	1.78902	0.592112
4.59979	0.340493	1.25148	2.14471	0.583518
4.03458	0.663102	1.63565	2.00863	0.814311
2.3567	0.641256	1.22933	1.53515	0.800785
3.85594	0.883797	1.84604	1.96366	0.940105
2.69029	0.546033	1.21202	1.64021	0.738941
2.4107	0.691062	1.29071	1.55264	0.831301
1.94882	1.20336	1.53138	1.396	1.09698
1.04085	1.13567	1.08723	1.02022	1.06568
1.06361	0.987983	1.0251	1.03131	0.993973
0.67572	1.10351	0.863519	0.822022	1.05048
0.65801	1.49875	0.99307	0.811178	1.22423
0.275326	1.78387	0.700818	0.524715	1.33562
0.117558	1.66248	0.442084	0.342867	1.28937
0.0564806	1.05596	0.244216	0.237656	1.0276
0.000867822	1.69986	0.0384081	0.0294588	1.30379
0.00173035	1.62266	0.0529884	0.0415975	1.27384
0.0143187	1.16951	−0.129406	−0.119661	1.08144
0.281147	1.20726	−0.582596	−0.530233	1.09876
0.157736	1.61945	−0.505417	−0.39716	1.27258
0.306005	1.6008	−0.699895	−0.553177	1.26523
0.642635	1.45788	−0.967927	−0.801645	1.20743
0.79288	1.00052	−0.89067	−0.890438	1.00026
1.03489	1.24493	−1.13506	−1.01729	1.11577
1.60093	1.01065	−1.272	−1.26528	1.00531
1.64702	1.38022	−1.50773	−1.28336	1.17483
2.23102	0.907779	−1.42312	−1.49366	0.952774
3.0366	0.521497	−1.2584	−1.74258	0.722147
2.38948	0.463	−1.05182	−1.54579	0.680441
2.76367	0.930127	−1.6033	−1.66243	0.964431
3.76154	0.444091	−1.29247	−1.93947	0.666401
4.45962	0.338183	−1.22808	−2.11178	0.581535
3.41287	0.175224	−0.773316	−1.84739	0.418598
4.69293	0.287063	−1.16068	−2.16632	0.535783
4.93631	0.274131	−1.16327	−2.22178	0.523575
5.37609	0.0794685	−0.653628	−2.31864	0.281902
4.82459	0.114703	−0.743905	−2.19649	0.338678
5.9839	0.0277383	−0.407411	−2.4462	0.166548
5.24968	0.0387553	−0.451058	−2.29122	0.196864
4.85865	0.00279674	0.116569	−2.20423	−0.0528842
7.26544	0.0522884	0.616359	−2.69545	−0.228667
5.80825	0.0011197	−0.0806442	−2.41003	0.0334619
4.60275	0.110247	0.712348	−2.1454	−0.332035
4.76794	0.121296	0.760483	−2.18356	−0.348276
4.09074	0.0703886	0.536602	−2.02256	−0.265309
5.65151	0.269968	1.2352	−2.37729	−0.519584
6.51296	0.117318	0.87412	−2.55205	−0.342517
5.83003	0.246838	1.19961	−2.41455	−0.496828
5.07284	0.221978	1.06116	−2.2523	−0.471146
3.09521	0.45168	1.18239	−1.75932	−0.672071
4.39473	0.339274	1.22107	−2.09636	−0.582472
4.19581	0.482333	1.4226	−2.04837	−0.694502
4.05622	0.670854	1.64959	−2.01401	−0.819056
2.14278	1.10235	1.53691	−1.46382	−1.04993
2.73928	0.780717	1.4624	−1.65508	−0.883582
2.35525	1.41028	1.82251	−1.53468	−1.18755
1.64822	0.881252	1.20519	−1.28383	−0.93875
1.54882	0.789396	1.10573	−1.24452	−0.888479
0.283962	1.2077	0.585612	−0.532881	−1.09895
0.179581	1.48195	0.515878	−0.42377	−1.21735
0.799066	1.11756	0.944989	−0.893905	−1.05715
0.296169	1.03745	0.554311	−0.544214	−1.01855
0.0365268	1.34049	0.221277	−0.19112	−1.15779
0.0410916	1.86338	−0.276712	0.202711	−1.36506
0.195196	1.21292	−0.486576	0.44181	−1.10132
0.377868	1.82846	−0.831214	0.61471	−1.3522
0.776883	1.75465	−1.16754	0.88141	−1.32463
1.05087	1.1931	−1.11973	1.02512	−1.09229
1.36999	1.62029	−1.4899	1.17047	−1.27291
0.137807	0.914242	−0.35495	0.371224	−0.95616
0.518397	1.18378	−0.78337	0.719998	−1.08802
0.574188	1.00415	−0.759324	0.757752	−1.00207
2.10864	1.4249	−1.73338	1.45211	−1.19369
1.12868	1.34012	−1.22987	1.06239	−1.15764
1.74734	0.586445	−1.01228	1.32187	−0.765797
2.59204	0.31007	−0.8965	1.60998	−0.556839
4.25079	0.616786	−1.61921	2.06175	−0.785357
3.21524	0.54245	−1.32065	1.79311	−0.736512
4.13744	0.650564	−1.64063	2.03407	−0.806575
4.10618	0.393031	−1.27038	2.02637	−0.626922
4.9532	0.14507	−0.847679	2.22558	−0.38088
4.32204	0.618939	−1.63557	2.07895	−0.786727
4.48748	0.159656	−0.846435	2.11837	−0.399569
3.87643	0.0113064	−0.209353	1.96887	−0.106332
3.45704	0.0938605	−0.569631	1.85931	−0.306367
4.4858	0.0836168	−0.612444	2.11797	−0.289166
4.79421	0.0142647	−0.261511	2.18957	−0.119435
7.31149	0.0134674	−0.313794	2.70398	−0.116049
5.88961	0.116453	0.828168	2.42685	0.341252
4.86242	0.127009	0.785858	2.20509	0.356384
6.04993	0.155007	0.968391	2.45966	0.393709
5.88949	0.24359	1.19776	2.42683	0.493548

```
Transpose[a].a // MatrixForm
```

1316.21	104.783	40.2213	26.2255	0.563607
104.783	79.8122	−5.04992	4.75003	1.82855
40.2213	−5.04992	104.783	0.563607	4.75003
26.2255	4.75003	0.563607	298.42	3.14992
0.563607	1.82855	4.75003	3.14992	69.4719

```
coefs = LinearSolve[Transpose[a].a, Transpose[a].ones]
```

```
{0.176033, 0.638387, −0.0072136, 0.00444945, 0.00985546}
```

```
p2 = ContourPlot[coefs[[1]] * x^2 + coefs[[2]] * y^2 + coefs[[3]] * x * y + coefs[[4]] * x + coefs[[5]] * y − 1 == 0, {x, −4, 4}, {y, −4, 4}, ColorFunction → Hue, PlotStyle -> {Red, Thick}];
```

```
Show[p1, p2]
```