Algorytmy optymalizacji

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Funkcja 1

Wzór: $f(x) = 20e^{-0.2x} + \frac{20}{20-x}$

Wynik działania algorytmu:

fmin = 4.306039211198519

xmin = 12.327846144241519

Ilość kroków pętli głównego algorytmu: 1

Ilość kroków złotego podziału: 22

Poszczególne kroki złotego podziału:

X	Y
12.068881230286156	4.311247720963294
13.493387913199754	4.419685181055664
11.188439542637390	4.403844153491700
12.612966784096050	4.312471207781958
11.732566213057355	4.333175786038343
12.276680177976401	4.306246933828632
12.405142425107286	4.306503595421678
12.197322918871983	4.307373452054627
12.325761608310588	4.306039697175002
12.356073700570700	4.306099869976863
12.307006121801747	4.306074515184339
12.337331357508326	4.306045664395884
12.318589452084590	4.306046518423121
12.330172511893622	4.306039499492136
12.332912060407265	4.306040910338054
12.328492866497957	4.306039215680796
12.327446441152199	4.306039262170259
12.329131234652523	4.306039271508151
12.328089981725517	4.306039213285652
12.327846144241519	4.306039224179548
12.328245837997665	4.306039211198519
12.328338976601428	4.306039211766550

Funkcja 2

Wzór: f(x) = $(x_1{}^3 + 2x_2{}^3)e^{1-x_1^2-x_2^2}$

Wynik działania algorytmu:

fmin = -1.091234053580764

xmin = [-1.124009445610160, -0.000126938443592]

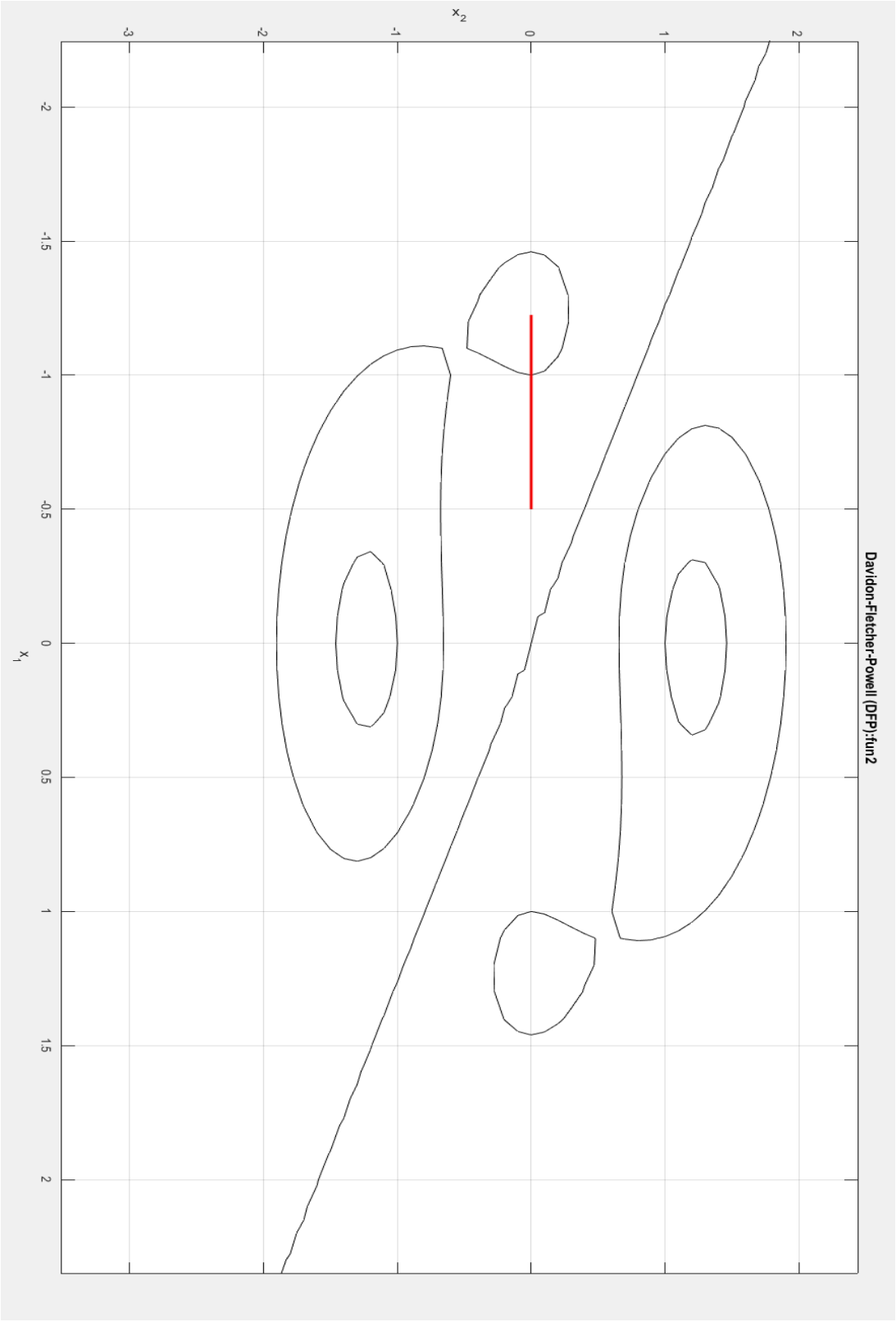
Ilość kroków głównej pętli algorytmu: 1

Ilość kroków złotego podziału: 21

Poszczególne kroki złotego podziału:

X0	X1	Y
-0.885665563062817	-0.078453598205620	-0.861869769122374
-1.271322120733265	-0.156905364499079	-1.109503077827378
-1.362362333549873	-0.175425120891498	-1.074257204206621
-1.215053098216492	-0.145458899720385	-1.114058085557528
-1.180278468126933	-0.138384908371173	-1.109815649780068
-1.236546176747224	-0.149831105871903	-1.113958609908807
-1.201771044788626	-0.142757012430527	-1.113084904560412
-1.223263119592998	-0.147129014400100	-1.114263053208762
-1.228336465540841	-0.148161054288207	-1.114239229083072
-1.220126946033374	-0.146491041700656	-1.114220365394899
-1.225200675374574	-0.147523159580140	-1.114267485054173
-1.226398599589143	-0.147766846012147	-1.114261856030274
-1.224460778887126	-0.147372646940954	-1.114267768164846
-1.224003207774887	-0.147279566034520	-1.114266721984902
-1.224743278675521	-0.147430114153520	-1.114267948016116
-1.224918057113263	-0.147465668267350	-1.114267881172107
-1.224635445451164	-0.147408178296998	-1.114267921343610
-1.224810107936691	-0.147443708823375	-1.114267938533253
-1.224702161280761	-0.147421749892158	-1.114267943959278
-1.224768875552525	-0.147435321170418	-1.114267946735985
-1.124009445610160	-0.000126938443592	-1.091234053580764

Wizualizacja kroków algorytmu:



Funkcja 3

Wzór:

$$-20\exp\left(\sqrt{\frac{1}{5}\left(x1^2+x2^2+x3^2+x4^2+x5^2\right)}\right)-\exp\left(\frac{1}{5}\left(\cos(2\pi x1)+\cos(2\pi x2)+\cos(2\pi x3)+\cos(2\pi x4)+\cos(2\pi x5)\right)\right)+20+\exp(1)$$

Wynik działania algorytmu: brak lokalnego minimum

Ilość kroków głównej pętli algorytmu: 4

Ilość kroków złotego podziału: 22

Poszczególne kroki złotego podziału:

X0	X1	X2	X3	X4	Y
9.99	9.99	9.99	9.99	9.99	17.29
10.00	10.00	10.00	10.00	10.00	17.29
9.99	9.99	9.99	9.99	9.99	17.29
10.00	10.00	10.00	10.00	10.00	17.29
10.00	10.00	10.00	10.00	10.00	17.29
9.99	9.99	9.99	9.99	9.99	17.29
9.99	9.99	9.99	9.99	9.99	17.29
9.99	9.99	9.99	9.99	9.99	17.29
10.00	10.00	10.00	10.00	10.00	17.29
9.99	9.99	9.99	9.99	9.99	17.29
9.99	9.99	9.99	9.99	9.99	17.29
9.99	9.99	9.99	9.99	9.99	17.29
9.99	9.99	9.99	9.99	9.99	17.29
9.99	9.99	9.99	9.99	9.99	17.29
9.99	9.99	9.99	9.99	9.99	17.29
9.99	9.99	9.99	9.99	9.99	17.29
9.99	9.99	9.99	9.99	9.99	17.29
9.99	9.99	9.99	9.99	9.99	17.29
9.99	9.99	9.99	9.99	9.99	17.29
9.99	9.99	9.99	9.99	9.99	17.29
9.99	9.99	9.99	9.99	9.99	17.29
NaN	9.99	9.99	9.99	9.99	9.99