
Zestaw 7

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2N

Metoda Brenta znaleźć minimum funkcji CS znalezionej w zadaniu 1N.

In[1]:= $CS[x_] := -0.156252122524907 + 0.5953030263542618 x - 1.7285531226262874 x^2 + 0.915400459845337 x^3$

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MetodaBrenta[xp_, xk_] := Module[{},
  SzMin[f_, a0_, c0_, b0_, max_] :=
  Module[{a = N[a0], b = N[b0], c = N[c0], k, fa, fb, fc, fs, s, temp},
    bis[funckja_, a00_, b00_, c00_, d00_] := Module[{ffd = N[funckja[d00]],
      aa = N[a00], bb = N[b00], cc = N[c00], dd = N[d00], ffb = N[funckja[b00]]},
      If[ffd < ffb,
        If[dd < bb, cc = bb; bb = dd; , If[dd > bb, aa = bb; bb = dd;];],
      If[ffd > ffb,
        If[dd < bb, aa = dd; , If[dd > bb, cc = dd;];];
    ];
    Return[{aa, bb, c}];
  ];
  k = 0;
  fa = CS[a];
  fb = CS[b];
  While[And[Abs[b - a] >  $\tau$ , k < max],
    fc = CS[c];
    If[And[fa  $\neq$  fc, fb  $\neq$  fc],
      
$$s = - \frac{a^2 (fc - fb) + b^2 (fa - fc) + c^2 (fb - fa)}{2 a (fc - fb) + b (fa - fc) + c (fb - fa)};$$

      {a, c, b} = bis[CS, a, c, b, s];,
      
$$s = \frac{a + b}{2};$$

      {a, c, b} = bis[CS, a, c, b, s];];
    fs = CS[s];
    If[c > s, temp = s; s = c; c = temp;];
    If[fc fs < 0,
      a = s; b = c; ,
      If[fs fb < 0, a = c, b = s;];];
    k = k + 1;]; Return[s];
  petla = True;
  For[i = 1, i ≤ 100, i++,
    a = RandomReal[{xp, xk}];
    b = RandomReal[{a + 10-8, xk}];
    c = RandomReal[{b + 10-8, xk}];
    If[And[(CS[a] > CS[b]), (CS[c] > CS[b]), (a < b < c)],
      minimum = SzMin[CS, a, b, c, 10-8, 20];
      If[petla == True,
        xpo = a; xps = b; xko = c;
        xm = minimum;
        petla == False; ,
        If[CS[minimum] < CS[xm],
          xpo = a; xps = b; xko = c; xm = minimum;
        ];];
    xpo = a; xps = b; xko = c;
    xm = minimum;];];
  Print["Punkty \n", "x1=", xpo, " x2=", xps,
    "\n x3=", xko, "\n x minmum=", xm, "\n y minimum=", CS[xm];];

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In[3]:= MetodaBrenta[-1.5, 1.5]
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Punkty

```
x1=0.213095 x2=1.3439 x3=1.43455  
x minmum=0.635927  
y minimum=-0.241301
```

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In[4]:= MetodaBrenta[-1, 1.5]
```

Punkty

```
x1=0.742578 x2=1.1747 x3=1.40763  
x minmum=0.925236  
y minimum=-0.360153
```

```
In[5]:= MetodaBrenta[0, 1.5]
```

Punkty

```
x1=0.807705 x2=1.19714 x3=1.26306  
x minmum=0.957563  
y minimum=-0.367433
```