

Bogdan Chwaliński

Zestaw 8 zadanie 1

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In[152]:= XY = Import["C:\\Users\\asdflo\\Downloads\\dane1.dat"];
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In[160]:=
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SplajnNat[XY0_] := Module[
    {XY = XY0},
    Dd = Module[
        {k},
        n = Length[XY] - 1;
        X = Transpose[XY][[1]];
        Y = Transpose[XY][[2]];
        h = d = Table[0, {n}];
        m = Table[0, {n + 1}];
        a = b = c = v = Table[0, {n - 1}];
        s = Table[0, {n}, {4}];

        h[[1]] = X[[2]] - X[[1]];
        d[[1]] =  $\frac{Y[[2]] - Y[[1]]}{h[[1]]}$ ;

        For[k = 2, k ≤ n, k++,
            h[[k]] = X[[k + 1]] - X[[k]];
            d[[k]] =  $\frac{Y[[k + 1]] - Y[[k]]}{h[[k]]}$ ;
            a[[k - 1]] = h[[k]];
            b[[k - 1]] = 2 (h[[k - 1]] + h[[k]]);
            c[[k - 1]] = h[[k]];
            v[[k - 1]] = 6 (d[[k]] - d[[k - 1]])];
        ];

    TrD := Module[
        {k, t},
        m[[1]] = 0;
        m[[n + 1]] = 0;

        For[k = 2, k ≤ n - 1, k++,
            t =  $\frac{a[[k - 1]]}{b[[k - 1]]}$ ;
            b[[k]] = b[[k]] - t c[[k - 1]];
            v[[k]] = v[[k]] - t v[[k - 1]];
        ];

        m[[n]] =  $\frac{v[[n - 1]]}{b[[n - 1]]}$ ;
    ];
```

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For[ k = n - 2, 1 ≤ k, k--,
  m[[k+1]] =  $\frac{v[[k]] - c[[k]] m[[k+2]]}{b[[k]]}$ ;
];

Pol := Module[
  {k},
  For[ k = 1, k ≤ n, k++,
    s[[k,1]] = Y[[k]];
    s[[k,2]] = d[[k]] -  $\frac{1}{6} h[[k]] (2 m[[k]] + m[[k+1]])$ ;
    s[[k,3]] =  $\frac{m[[k]]}{2}$ ;
    s[[k,4]] =  $\frac{m[[k+1]] - m[[k]]}{6 h[[k]]}$ ;
  ];
];

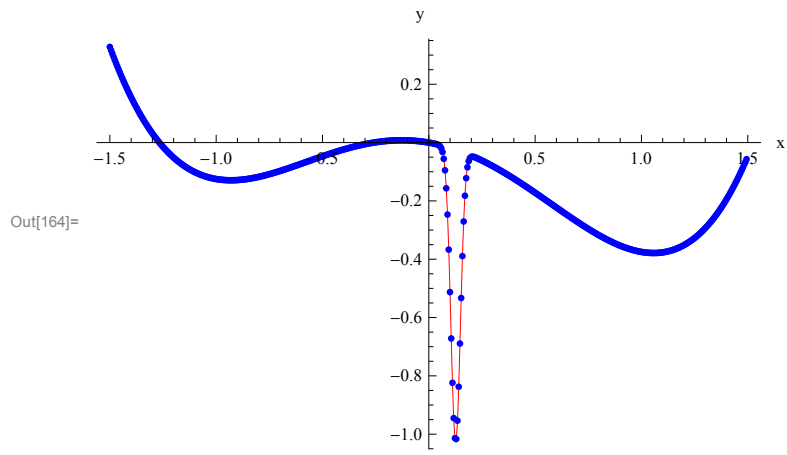
CS[t_] := Module[
  {j},
  For[ j = 1, j ≤ n, j++,
    If[ X[[j]] ≤ t && t < X[[j+1]], k = j ];
    If[ t < X[[1]], k = 1 ];
    If[ X[[n+1]] ≤ t, k = n ];
    w = t - X[[k]];

    Return[ ((s[[k,4]] w + s[[k,3]]) w + s[[k,2]]) w + s[[k,1]] ];
  ];

Dd;
TrD;
Pol;
];

In[161]:=
SplajnNat[XY];
dots =
  ListPlot[XY, PlotStyle → {Blue, PointSize[0.01]}, DisplayFunction → Identity];
gr = Plot[CS[x], {x, -1.5, 1.5}, PlotStyle → {Red}, DisplayFunction → Identity];
Show[gr, dots, AxesLabel → {"x", "y"}];
Print["F(x) = ", Expand[CS[x]]];

```



$$F(x) = 677.85 - 1364.54x + 914.406x^2 - 203.998x^3$$