Lab 1

Systemy CAD/CAE

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1. Zmodyfikowany fragment kodu

```
function splines_comp(precision,knot_vector, coefficient_vector)

% subroutine calculating number of basis functions
compute_nr_basis_functions = @(knot_vector,p) size(knot_vector, 2) - p - 1;
% subroutine generating mesh for drawing basis functions
mesh = @(a,c) [a:(c-a)/precision:c];
% subroutine drawing basis functions
plot_spline = @(x, spline) plot(x, spline,'LineWidth',3);

% computing order of polynomials
p = compute_p(knot_vector);
% validation of knot vector construction
t = check_sanity(knot_vector,p);
% if knot vector is poorly constructed - stop further processing
if (~t)
disp("Poorly constructed knot_vector")
return
end
% computating number of basis functions
nr = compute_nr_basis_functions(knot_vector,p);

% beginning of drawing range
x_begin = knot_vector(1);
% end of drawing range
x_end = knot_vector(size(knot_vector,2));
x=mesh(x_begin,x_end);

% drawing functions
spline = zeros(size(x))
% keep old window with plots in order to draw next functions
% drawing rest of basis functions
for i=1:nr
spline = spline + coefficient_vector(i) * compute_splines(knot_vector, p,
   i, x)
end
plot_spline(x, spline)
hold on

I = imread('landscape.jpg');

% size of image
[height, width, ~] = size(I);
h = image([0 width], [0 height], I(end:-1:1,:,:));

uistack(h,'bottom');
```

```
38. hold off;
```

2. Zdjęcie dla którego dobieramy kombinację spline'ów

3. Wektor węzłów oraz współczynników użyty do przybliżenia zdjęcia

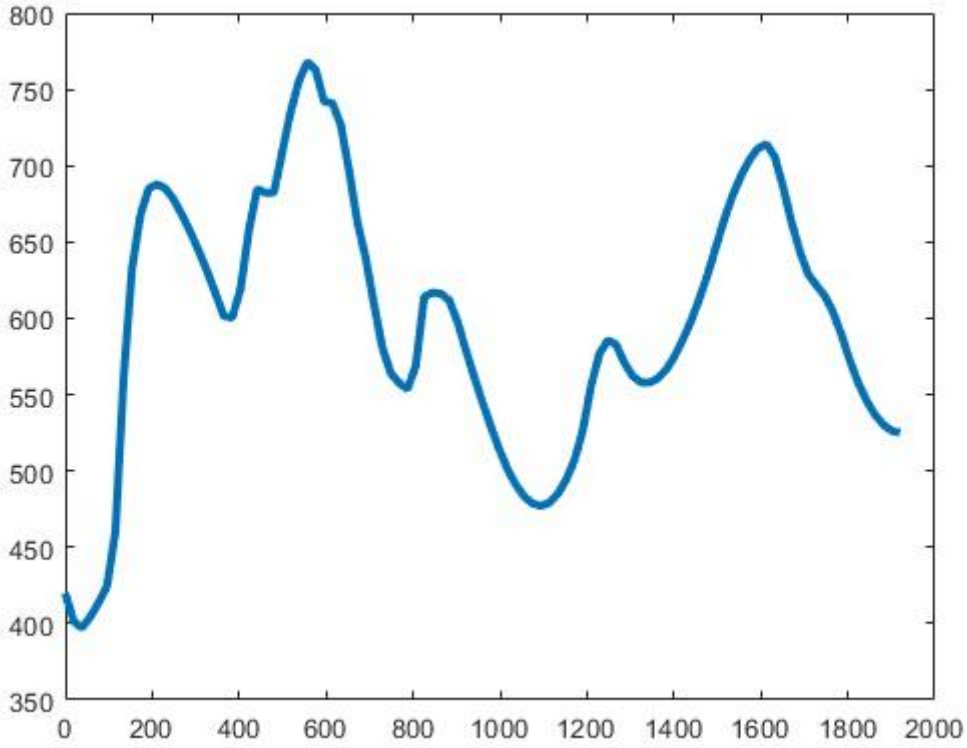
knot_vector =
[0,0,0,45,100,110,130,150,200,250,360,420,460,490,545,590,600,660,670,710,760,800,808,
808,815,880,900,1000,1075,1175,1200,1275,1325,1400,1500,1600,1650,1700,1725,1790,1
920,1920,1920]

coefficient_vector =
[420,390,410,430,470,600,685,690,650,580,700,670,740,780,740,750,670,645,565,555,550,
580,610,622,610,550,485,470,520,605,560,555,600,700,720,655,625,615,525,525]

Wykonano polecenie:

splines_comp(100,
[0,0,0,45,100,110,130,150,200,250,360,420,460,490,545,590,600,660,670,710,760,800,808,
808,815,880,900,1000,1075,1175,1200,1275,1325,1400,1500,1600,1650,1700,1725,1790,1
920,1920,1920],
[420,390,410,430,470,600,685,690,650,580,700,670,740,780,740,750,670,645,565,555,550,
580,610,622,610,550,485,470,520,605,560,555,600,700,720,655,625,615,525,525])

4. Wygenerowano krzywą



5. Nałożono krzywą na zdjęcie