Computer graphics
Lesson 1

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Information

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- *Lectures* – even week
- *Tutorials* – odd week (attendance counted)

- **Moodle** - B232-E012037 - Computer Graphics
- *Textbook* – Linkeová, I.: Curves and Surfaces for Computer Graphics

- **Drawing aids** – set-square/ruler, pencil, colour pencils, rubber, A4 squared paper (5 mm squared grid)
- *Completion of subject* – award of graded assessment + conditions
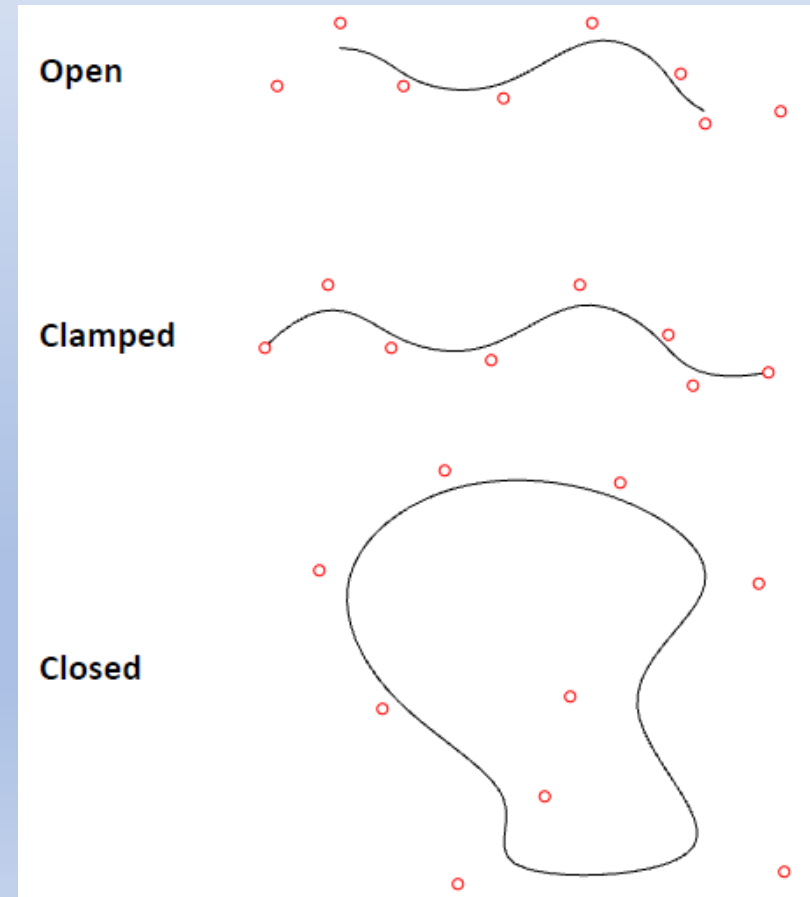
Curve types

1. Interpolation curves:
   - definition points, definition polygon
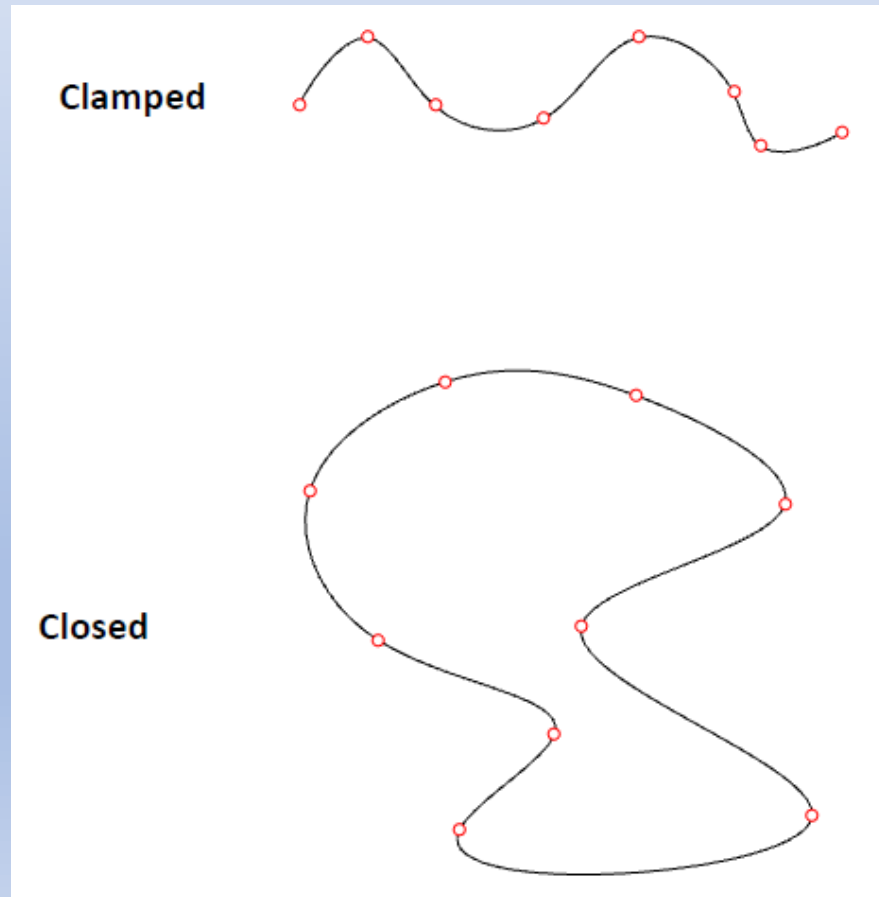
2. Approximation curves:
   - control points, control polygon

Ferguson cubic curve

- interpolation curve

- vector equation:

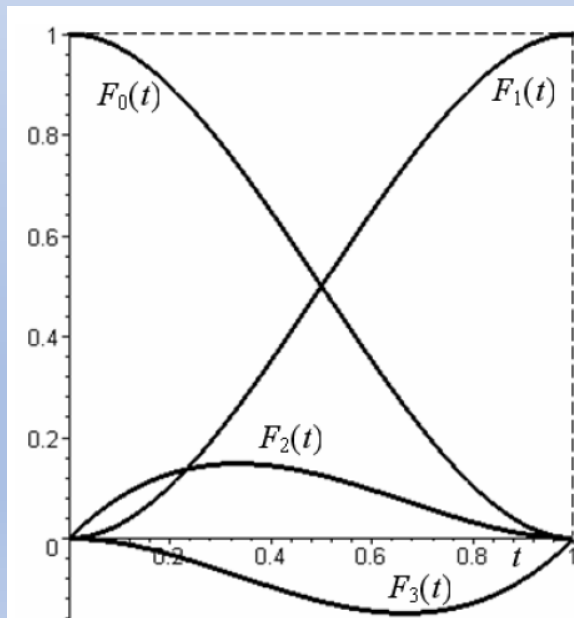$$\mathbf{P}(t) = F_0(t)\mathbf{A} + F_1(t)\mathbf{B} + F_2(t)\mathbf{a} + F_3(t)\mathbf{b}, \ t \in [0,1],$$

basis functions are Hermit polynomials
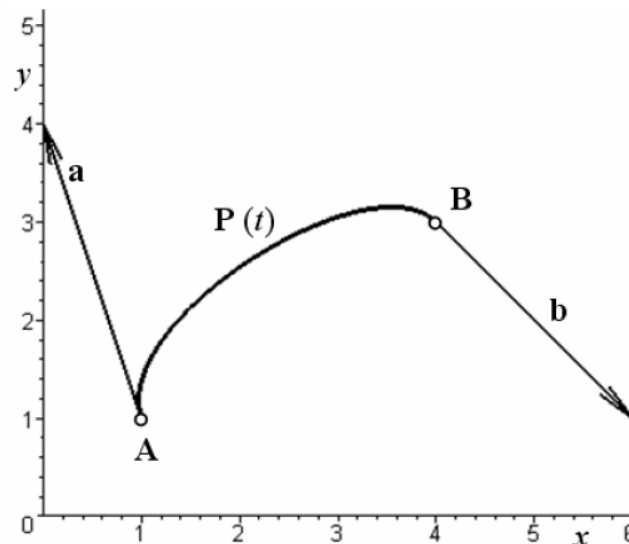
$$\begin{aligned}
F_0(t) &= 2t^3 - 3t^2 + 1, \\
F_1(t) &= -2t^3 + 3t^2, \\
F_2(t) &= t^3 - 2t^2 + t, \\
F_3(t) &= t^3 - t^2, \ t \in [0,1]
\end{aligned}$$

a) Hermit polynomials

b) Ferguson cubic curve

Ferguson cubic curve

- *properties*:
  - the initial point **P(0)** is the given point **A**
  - the terminal point **P(1)** is the given point **B**
  - tangent vector **P´(0)** is the given tangent vector **a**
  - tangent vector **P´(1)** is the given tangent vector **b**

- **Example 2.1**

Ferguson cubic curve

- **Exercise 2.1** – compare shapes

- **Exercise 2.2** – continuity and closed curve