Mathematical tools 1
Session 5

Franck HÉTROY

M2R IVR, November 9th 2006

Outline of the course

Two parts:

1. Interpolation and approximation (4 sessions)
   1. Splines (2 sessions)
   2. Wavelets and multiresolution (2 sessions)
2. Position, orientation and motion (4 sessions)
   1. Representations of position, orientation, and rotations (2 sessions)
   2. Kinematics (2 sessions)

No more slides (except these few ones), but:

- a short mathematical reminder;
- François Faure's lecture notes;
- some hand written slides.

Mathematical reminder: affine space

- Affine space
- Affine reference frame
- Affine transformation (or map)
- Matricial representation
- Changing the reference frame

Mathematical reminder: gradient, Jacobian and Hessian

- The nabla symbol (del operator)
- Jacobian
- Hessian
- Critical points

Rotations

- Definition
- Mathematical representations
    - Matrix
    - Euler angles
    - Rotation vectors
    - Quaternions
- Applications

$\rightsquiggle$ *see chapter 2 in FF's lecture notes*

The end !