

File conversion

CAD / lecture

October 5, 2010

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File conversion

Key functionality in a digital environment:
Communication

Many languages where and are developed
Rapid change of functionality
Difference as competitive edge



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File conversion

Architecture and digital manufacturing

Problem digital communication

Result: File conversion

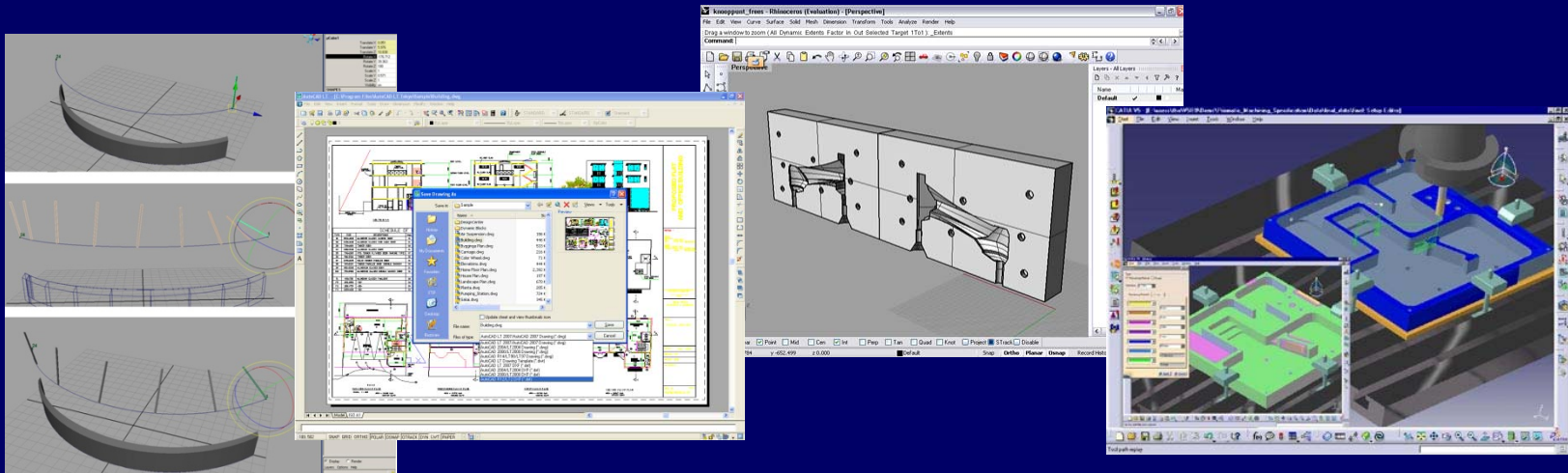


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File conversion

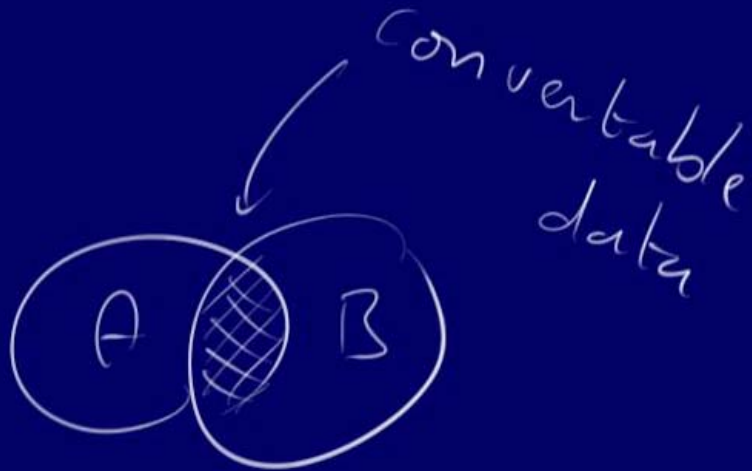
Problem native file format
Parametric information, functionality, supported geometry, etc.
will be often lost during conversion



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File conversion: almost always data loss



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File conversion:

Geometry incorrect converted

- Size
- Curvature
- Accuracy

Loss of geometry

- Unsupported geometry type
- Misinterpretation of the geometry
- Unsupported functionality

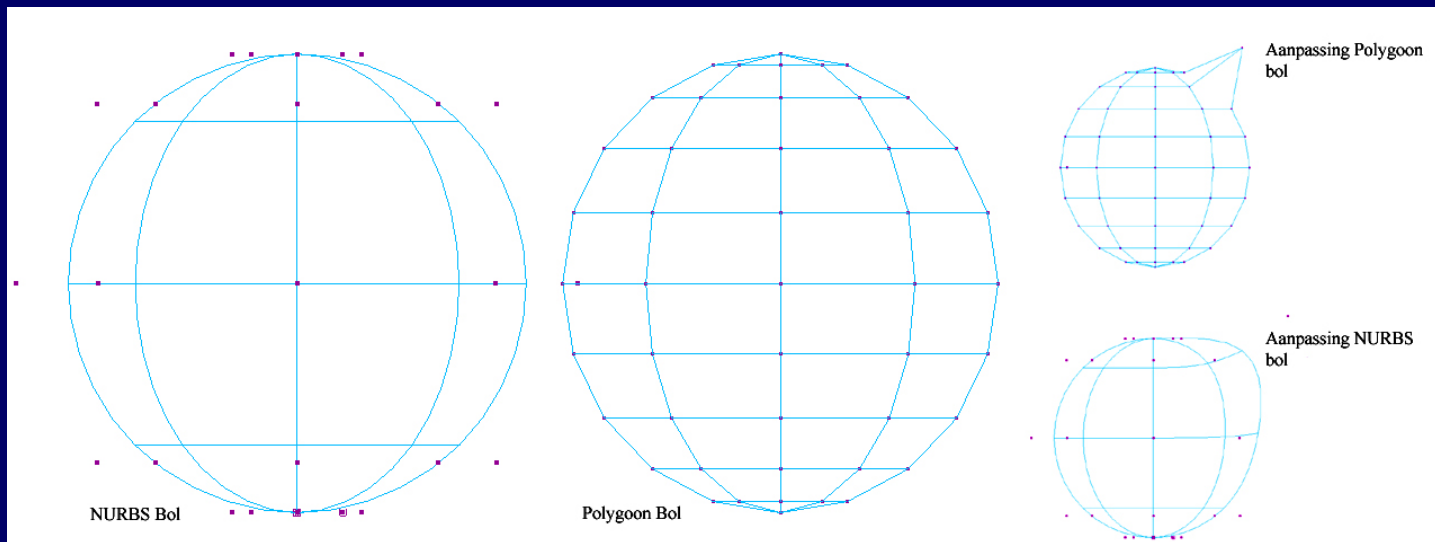
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File conversion: different geometry



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File conversion – kernel mathematics

Accuracy loss during mathematical conversion!

$$C(u) = \frac{\sum_{i=0}^n w_i N_{i,p}(u) P_i}{\sum_{i=0}^n w_i N_{i,p}(u)}$$

u : parameter
 $N_{i,p}$: basis function
 P_i : control point
 w_i : weight

$$C(u) = \sum_{i=0}^n R_{i,p}(u) P_i$$

$$V = \underbrace{(v_0, \dots, v_0)}_{q+1}, v_1, \dots, v_{j-1}, \underbrace{v_j, \dots, v_j}_{q+1}$$

$$R_{i,p}(u) = \frac{w_i N_{i,p}(u)}{\sum_{i=0}^n w_i N_{i,p}(u)}$$

$$U = \underbrace{(u_0, \dots, u_0)}_{p+1}, u_1, \dots, u_{i-1}, \underbrace{u_i, \dots, u_i}_{p+1}$$

$$S(u, v) = \frac{\sum_{i=0}^n \sum_{j=0}^m w_{i,j} N_{i,p}(u) N_{j,q}(v) P_{i,j}}{\sum_{i=0}^n \sum_{j=0}^m w_{i,j} N_{i,p}(u) N_{j,q}(v)}$$

$$U = \underbrace{(u_0, \dots, u_0)}_{p+1}, u_1, \dots, u_{i-1}, \underbrace{u_i, \dots, u_i}_{p+1}$$

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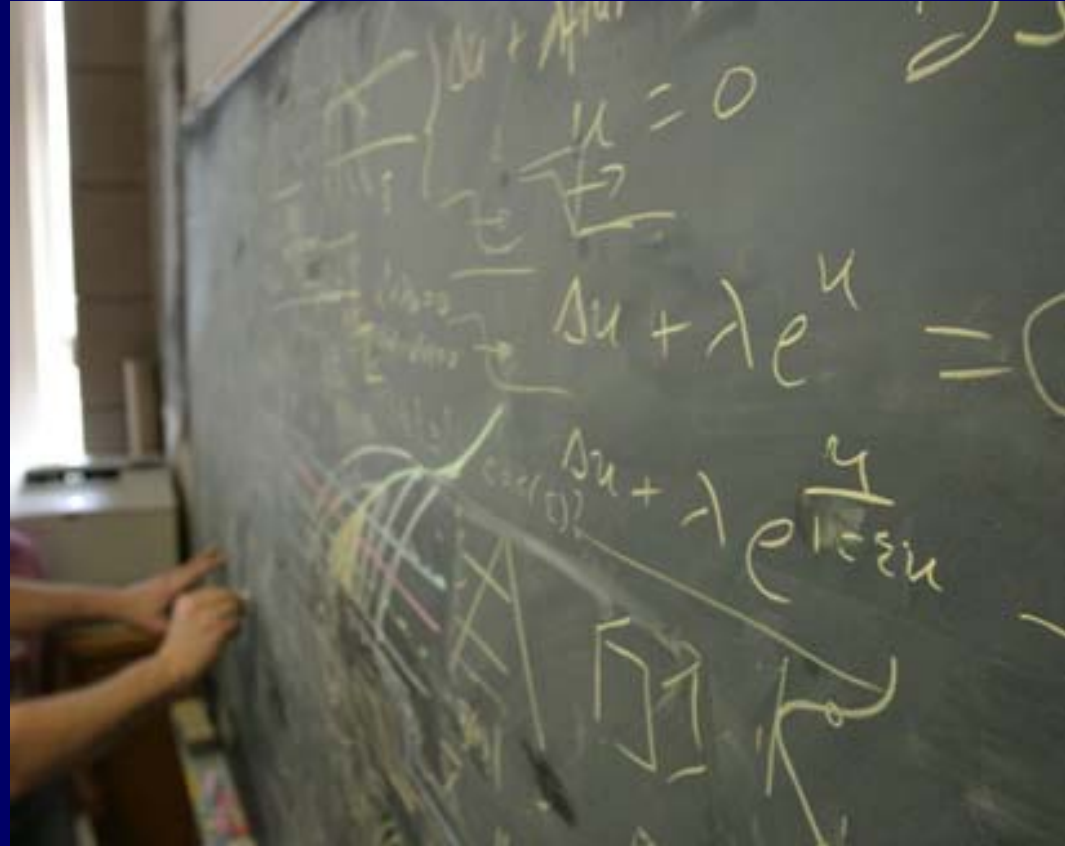
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File conversion problem:

- Geometry representation
- Mathematical description of the geometry
- Accuracy of the conversion
- Loss of all or most native functionality

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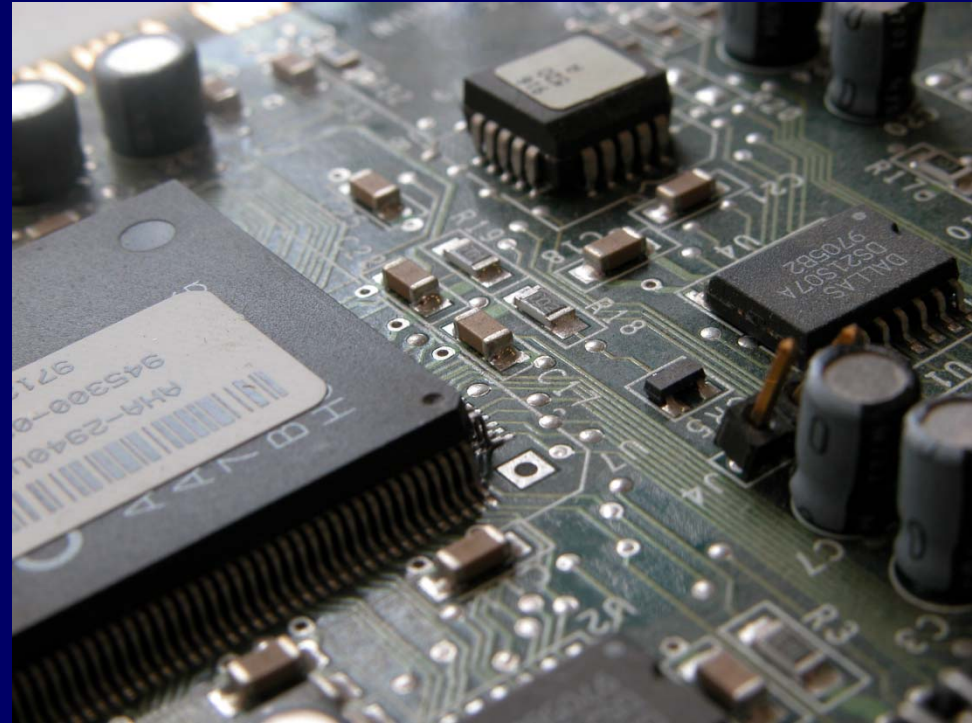


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File conversion solutions:

- Exchange standard – DXF – IGES - STEP
- Similar kernel
- File conversion software
- Access to the Application Programming Interface



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