

## Tutorial 25: Automatic Creation of Video Titels, Endtitels and Textpages

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### Complete List of all Tutorials with Publishable MATLAB Files of this Solid-Geoemtries Toolbox

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The following topics are covered an explained in the specific tutorials:

- Tutorial 01: First Steps Using the VLFL-Toolbox for Solid Object Design
- Tutorial 02: Using the VLFL-Toolbox for STL-File Export and Import
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- Tutorial 04: 2½D Design Using Boolean Operators on Closed Polygon Lists (CPL)
- Tutorial 05: Creation, Relative Positioning and Merging of Solid Geometries (SG)
- Tutorial 06: Relative Positioning and Alignment of Solid Geometries (SG)
- Tutorial 07: Rotation of Closed Polygon Lists for Solid Geometry Design
- Tutorial 08: Slicing, Closing, Cutting and Separation of Solid Geometries
- Tutorial 09: Boolean Operations with Solid Geometries
- Tutorial 10: Packaging of Sets of Solid Geometries (SG)
- Tutorial 11: Attaching Coordinates Frames to Create Kinematik Models
- Tutorial 12: Define Robot Kinematics and Detect Collisions
- Tutorial 13: Mounting Faces and Conversion of Blocks into Leightweight-structures
- Tutorial 14: Manipulation Functions for Closed Polygons and Laser Cutting (SVG)
- Tutorial 15: Create a Solid by 2 Closed Polygons
- Tutorial 16: Create Tube-Style Solids by Succeeding Polygons
- Tutorial 17: Filling and Bending of Polygons and Solids
- Tutorial 18: Analyzing and modifying STL files from CSG modeler (Catia)
- Tutorial 19: Creating drawing templates and dimensioning from polygon lines
- Tutorial 20: Programmatically Interface to SimMechanics Multi-Body Toolbox
- Tutorial 21: Programmatically Convert Joints into Drives (SimMechanics)
- Tutorial 22: Adding Simulink Signals to Record Frame Movements
- Tutorial 23: Automatic Creation of a Missing Link and 3D Print of a Complete Model
- Tutorial 24: Automatic Creation of a Joint Limitations
- Tutorial 25: Automatic Creation of Video Titels, Endtitels and Textpages
- Tutorial 26: Create Mechanisms using Universal Planar Links
- Tutorial 27: Fourbar-Linkage: 2 Pose Syntheses and Linkage Export for 3D Printing
- Tutorial 28: Fourbar-Linkage: 3 Pose Syntheses and Linkage Export for 3D Printing
- Tutorial 29: Create a multi body simulation using several mass points
- Tutorial 30: Creating graphical drawings using point, lines, surfaces, frames etc.
- Tutorial 31: Importing 3D Medical DICOM Image Data and converting into 3D Solids
- Tutorial 32: Exchanging Data with a FileMaker Database
- Tutorial 33: Using a Round-Robin realtime multi-tasking system
- Tutorial 34: 2D Projection Images and Camera Coordinate System Reconstruction
- Tutorial 35: Collection of Ideas for Tutorials
- Tutorial 36: Creating a Patient-Individual Arm-Skin Protector-Shell

### Motivation for this tutorial: (Originally SolidGeometry 3.2 required)

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The creation of videos of the simulated multi body system, created with the SimMultiBody (2nd Generation) is essential for documentation of the results. Nevertheless, without video titles and end titles and some pages with text description, the videos cannot fulfill their purpose. Therefor it is essential also, to create text for explaining content and make comments on authors and creation date. Therefor we will show some examples:

- `imageVideoFrames(xy,ptime)`; cuts images out of a video a defined positions
- `imageVideoTitle(xy,STitles,cols,ptime)`, creates a 2 second title page video
- `imageVideoEndtitle(xy,ETitles,cols)`, creates a 1 second end title page video
- `imageVideoTextPage(xy,ETitles,cols)`, creates a 2 second text page video

- `imageVideoWrite(v,I,t)`, creates a video by repeating an image `t` frames
- `videoCopyFrames(v,vr)`, copies a video content into another video (no sound)
- `videoCopyCutMovies(WName,RName,style)`, complex cutting function

### 3. Create a video clip for a text title

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It is possible to start by defining the size of the video titles. If the function is called without an output parameter, automatically a video clip is created with this image

```
I=imageVideoTitle([640 480],{'Video Titel','$date'});  
imshow(I.cdata);
```

VIDEO TITEL

2023-OCT-03

It is also possible to name an existing video or to select it during function execution to define the size from an existing video. In addition, the background color and text color can be defined (in future also font name and font size), and furthermore times for creating a snapshot that becomes part of the title page. `I=imageVideoTitle('','Video Titel','SubTitle','Author','$date',[w' 'r],[0 1 3]);`

```
close all; figure; imshow(I.cdata);
```

## VIDEO TITEL

2023-OCT-03

Calling the function without an output parameter creates a small video clip in the desktopdir. This can later be used to add the original video including text pages, title page and end title page to a video clip that has sound. Matlab in 2016b does not support sound videos on MAC, only on PC platforms. `imageVideoTitle('Video Titel','SubTitle','Author','$date'),'w','r',[0 1 3]);`

### 4. Create an end title video clip

In similar manner, it is possible to define end titles. The creation date is added automatically. Please use the title page if you want to clarify the result was achieved earlier.

```
I=imageVideoEndtitle([640 480],{'Technical University of Munich','','www.tum.de'});  
imshow(I.cdata);  
I=imageVideoEndtitle([640 480],{'Technical University of Munich','','www.tum.de'}); % write video clip
```

TECHNICAL UNIVERSITY OF MUNICH

WWW.TUM.DE

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### 5. Create a text page title for a video

There are several reasons for adding text pages including latex equations too. This is also possible by a toolbox function. Again, the call without an output parameter would create a video clip.

```
I=imageVideoTextPage([640 480],...  
['It is also possible to name an existing video or to select it during function '...]
```

```
'execution to define the size from an existing video. In addition, the '...
'background color and text color can be defined (in future also font name and '...
'font size), and furthermore times for creating a snapshot that becomes part of '...
'the title page.', char(13), '@');
imshow(I.cdata);
```

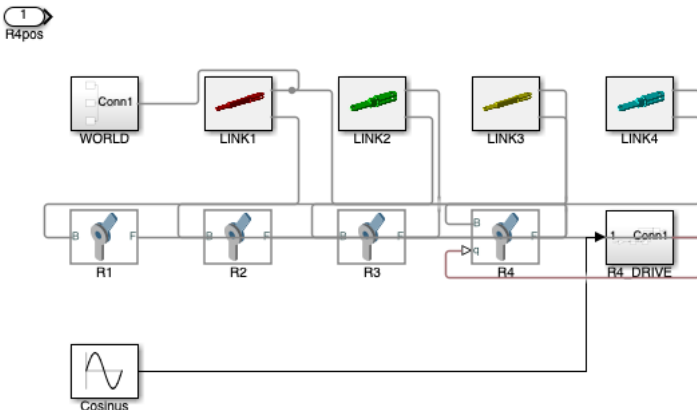
It is also possible to name an existing video or to select function execution to define the size from an existing video. In addition, the background color and text color can be defined (in future also font name and font size), and furthermore times for creating a snapshot that becomes part of the title page.

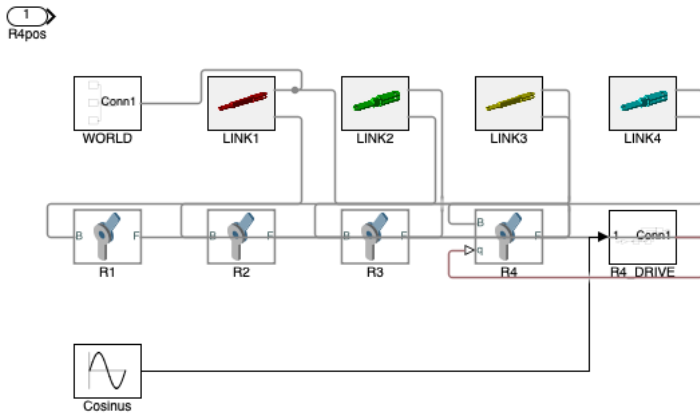
©

**6. Now create a SimMultiBody fourbar linkage**

```
smbNewSystem ('SG_LIB_EXP_25'); % Creates the mechsmb diagramm
SG1=SGmodelLink(80,'r',1,2); % Creates a long rod with flange
SG2=SGmodelLink(50,'r',1,2); % Creates a short rod with flange
smbCreateSG (SG1,'LINK1','r'); % Add long rod as LINK1
smbCreateSG (SG2,'LINK2','g'); % Add short rod as LINK2
smbCreateSG (SG1,'LINK3','y'); % Add long rod as LINK3
smbCreateSG (SG2,'LINK4','c'); % Add short rod as LINK4
smbCreateJoint ('R','R1','LINK1.F','LINK2.B'); % Add a RR Joint
smbCreateJoint ('R','R2','LINK2.F','LINK3.B'); % Add a RR Joint
smbCreateJoint ('R','R3','LINK3.F','LINK4.B'); % Add a RR Joint
smbCreateJoint ('R','R4','LINK4.F','LINK1.B'); % Add a RR Joint
smbCreateConnection('WORLD.ORIGIN','LINK1.B'); % Connect Linkage to World Frame
smbCreateDrive ('R4'); % Convert Joint R4 into a Drive
smbCreateSineWave ('Cosinus','R4_DRIVE/1'); % Connect a Sinus Generator to Drive
smbDrawNow;
```

Creating temporary directory '/Users/timlueth/Desktop/tmp\_SG\_LIB\_EXP\_25/'

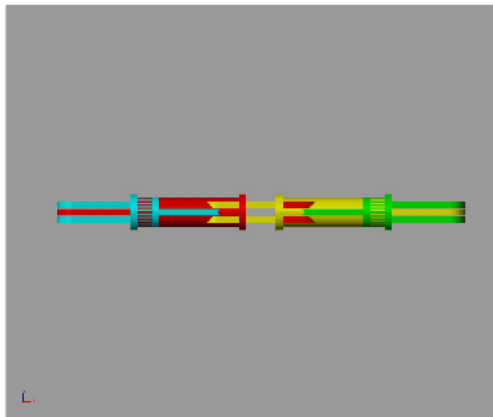




**7. Create a video simulation and creates header and titles**

```
[I,FN]=smbVideoSimulation (10);
```

.....



**Now we create four small video clips in the desktopdir**

```
imageVideoTitle(FN,{'SG-Lib Tutorial #25','Creating Videos Titles for SimMultiBody Videos','Tim C. Lueth','$date'},'',[2 5]);
imageVideoEndtitle(FN,{'Technical University of Munich','www.tum.de'});
imageVideoTextPage(FN,{...
['This video was created by using Mathwork's SimMultiBody environment using the '...
'SG-Library of Tim C. Lueth. The fourbar linkage in the simulation has the '...
'following dimensions:©', char(13), ' '...
'L1= ', sprintf('%0.2f mm',80), char(13), ' '...
'L2= ', sprintf('%0.2f mm',50),char(13), ' '...
'L3= ', sprintf('%0.2f mm',80),char(13), ' '...
'L4= ', sprintf('%0.2f mm',50),char(13), ' ']);
imageVideoImagePage(FN,smbDrawNow);
```

```
imageVideoTitle: File format used for /Users/timlueth/Desktop/tmp_SG_LIB_EXP_25/Video_SG_LIB_EXP_25_005.avi
imageVideoTitle: Creating a new video file: '/Users/timlueth/Desktop/tmp_SG_LIB_EXP_25/Video_SG_LIB_EXP_25_005_Title.mp4'
Warning: The video's width and height has been padded to be a multiple of two as
required by the H.264 codec.
imageVideoEndtitle: File format used for /Users/timlueth/Desktop/tmp_SG_LIB_EXP_25/Video_SG_LIB_EXP_25_005.avi
imageVideoEndtitle: Creating a new video file: '/Users/timlueth/Desktop/tmp_SG_LIB_EXP_25/Video_SG_LIB_EXP_25_005_Credits.mp4'
Warning: The video's width and height has been padded to be a multiple of two as
required by the H.264 codec.
Creating a new video file: '/Users/timlueth/Desktop/imageVideoTextPage.mp4'
Warning: The video's width and height has been padded to be a multiple of two as
required by the H.264 codec.
Creating a new video file: '/Users/timlueth/Desktop/imageVideoImagePage.avi'
```

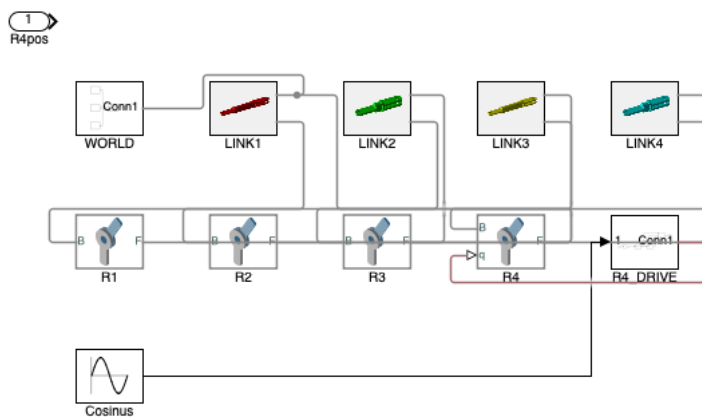
This video was created by using Mathwork's using the SG-Library of Tim C. Lueth. The f simulation has the following dimensions:©

L1= 80.00 mm

L2= 50.00 mm

L3= 80.00 mm

L4= 50.00 mm



### 8. Create Video Headers and Explanation

```
[I, FN] = smbVideoSimulation (10, 'Video SG_LIB_EXP_25');
IT = imageVideoTitle(FN, {'SG-Lib Tutorial #25', 'Creating Videos for SimMultiBody Videos', 'Tim C. Lueth', '$date'}, '', [2 5]);
IE = imageVideoEndtitle(FN, {'Technical University of Munich', '', 'www.tum.de'});
ID = imageVideoTextPage(FN, {
    ['This video was programmatically created by using Mathwork's SimMultiBody environment using the '...
    'SG-Library of Tim C. Lueth. The fourbar linkage in the simulation has the '...
    'following dimensions: @', char(13), ' '...
    'L1= ', sprintf('%.2f mm', 80), char(13), ' '...
    'L2= ', sprintf('%.2f mm', 50), char(13), ' '...
    'L3= ', sprintf('%.2f mm', 80), char(13), ' '...
    'L4= ', sprintf('%.2f mm', 50), char(13), ' '...
    '']});
IM = imageVideoImagePage(FN, smbDrawNow);
videoWriteClipMovie(smbFilename('Video comp SG_LIB_EXP_25.avi'), IT, 2, ID, 5, IM, 5, smbFilename('Video SG_LIB_EXP_25.avi'), IE, 1);
```

```
.....Creating a new video file (NO SOUND/2016b): '/Users/timlueth/Desktop/tmp_SG_LIB_EXP_25/Video comp SG_LIB_EXP_25.avi'
5% 10% 15% 20% 25% 30% 35% 40% 45% 50% 55% 60% 65% 70% 75% 80% 85% 90% 95% 100%
```

### Final Remarks

#### VLFLlicense

```
This VLFL-Lib, Rel. (2023-Oct-03), is for limited non commercial educational use only!
Licensee: Tim Lueth (Development Version)!
Please contact Tim Lueth, Professor at TU Munich, Germany!
WARNING: This VLFL-Lib (Rel. ) license will exceed at 06-Jul-2078 07:48:54!
Executed 03-Oct-2023 07:48:56 by 'timlueth' on a MACI64 using Mac OSX 13.6 | R2023a Update 5 | SG-Lib 5.4
===== Used Matlab products: =====
distrib_computing_toolbox
fixed_point_toolbox
map_toolbox
matlab
simmechanics
simscape
simulink
=====
```