Exercise 25: Automatic Creation of Video Titels, Endtitels and Textpages

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1. Summary of the already explained aspects of the VLFL-Toolbox

The previous examples of this series covered the following topics:

- Example 01: First Steps Using the VLFL-Toolbox for Solid Object Design
- Example 02: Using the VLFL-Toolbox for STL-File Export and Import
- Example 03: Closed 2D Contours and Boolean Operations in 2D
- Example 04: 2.5D Design Using Boolean Operators on Closed Polygon Lists (CPL)
- Example 05: Creation, Relative Positioning and Merging of Solid Geometries (SG)
- Example 06: Relative Positioning and Alignment of Solid Geometries (SG)
- Example 07: Rotation of Closed Polygon Lists for Solid Geometry Design
- Example 08: Slicing, Closing, Cutting and Separation of Solid Geometries
- Example 09: Boolean Operations with Solid Geometries
- Example 10: Packaging of Sets of Solid Geometries (SG)
- Example 11: Attaching Coordinates Frames to Create Kinematik Models
- Example 12: Define Robot Kinematics and Detect Collisions
- Example 13: Mounting Faces and Conversion of Blocks into Leightweight-structures
- Example 14: Manipulation Functions for Closed Polygons and Laser Cutting (SVG)
- Example 15: Create a Solid by 2 Closed Polygons
- Example 16: Create a Solid along a contour
- Example 20: Programmaticaly Interface to SimMechanics Multi-Body Toolbox
- Example 21: Programmaticaly Design of SimMechanisms Mechanisms and Simulink Signals
- Example 22: Creation of fixed nodes for the assembly of joints
- Example 23: Automatic Creation of a Missing Link and 3D Print of a Complete Model
- Example 24: Automatic Creation of a Joint Limitations
- Example 25: Automatic Creation of Video Titels, Endtitels and Textpages

2. Motivation for this tutorial

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

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

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



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);
```



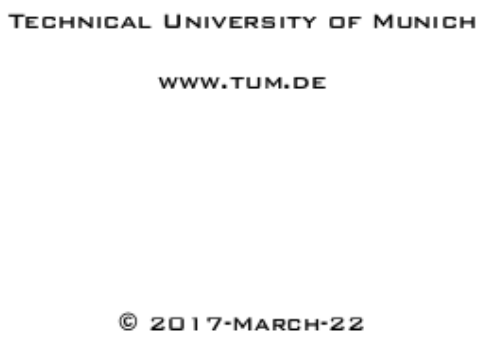
Calling the function without an output parameter creates a small video clip in the desktopdir. This can later be used to add the original video including text pages, title page and end title page to a video clip that has sound. Matlab in 2016b does not support sound videos on MAC, only on PC platforms. 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);
imageVideoEndtitle([640 480],{'Technical University of Munich','','www.tum.de'}); % write video clip
```

```
Creating a new video file: '/Users/lueth/Desktop/imageVideoEndtitle.avi'
```



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.

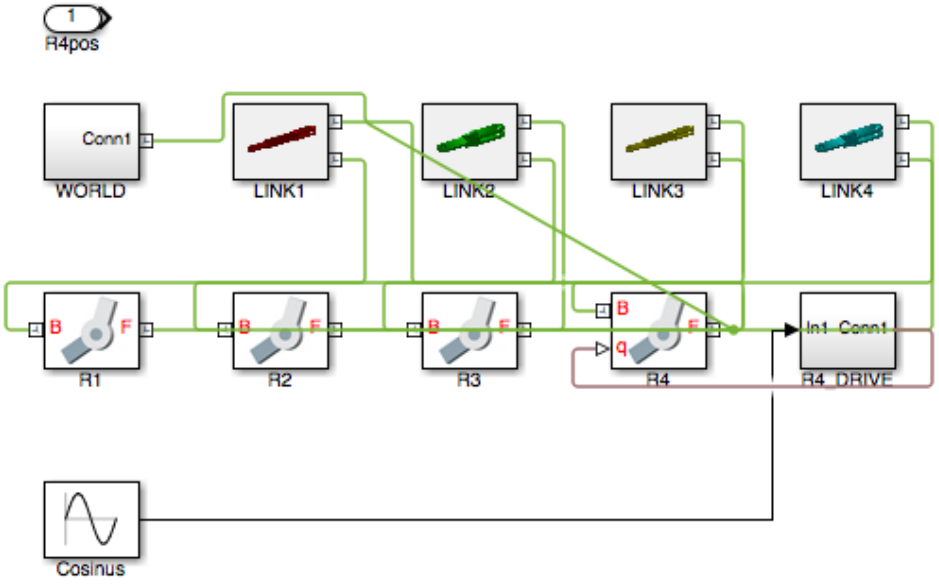
```
I=imageVideoTextPage([640 480],...
['It is also possible to name an existing video or to select it during function '...
'execution to define the size from an existing video. In addition, the '...
'background color and text color can be defined (in future also font name and '...
'font size), and furthermore times for creating a snapshot that becomes part of '...
'the title page.', char(13), '©']);
imshow(I.cdata);
```

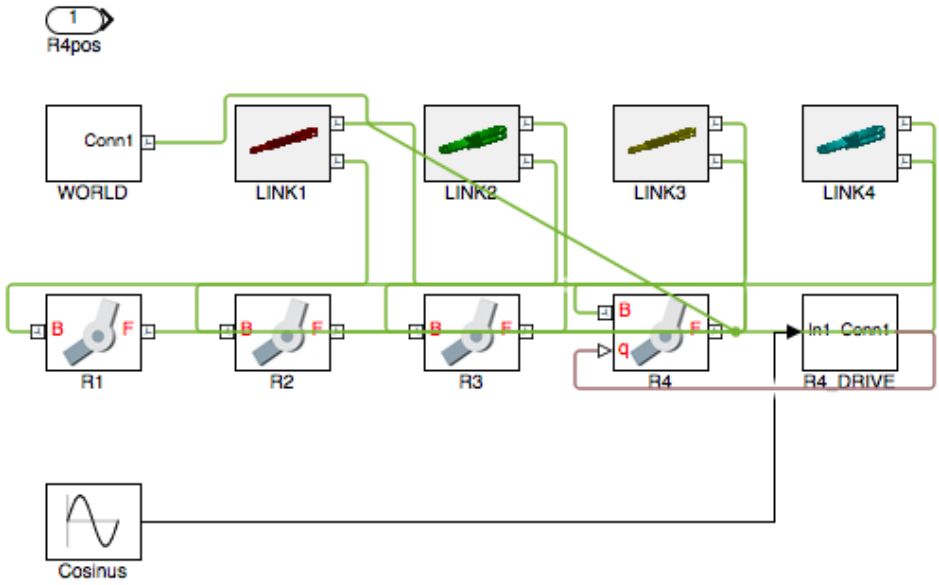
It is also possible to name an existing video or to select it during function execution to define the size from an existing video. In addition, the background color and text color can be defined (in future also font name and font size), and furthermore times for creating a snapshot that becomes part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

6. Now create a SimMultiBody fourbar linkage

```
smbNewSystem ('SG_LIB_EXP_25');           % Creates the mechansim diagramm
SG1=SGmodelLink(80,'',1,2);               % Creates a long rod with flange
SG2=SGmodelLink(50,'',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/lueth/Desktop/tmp_SG_LIB_EXP_25/'
```





7. Create a video simulation and creates header and titles

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

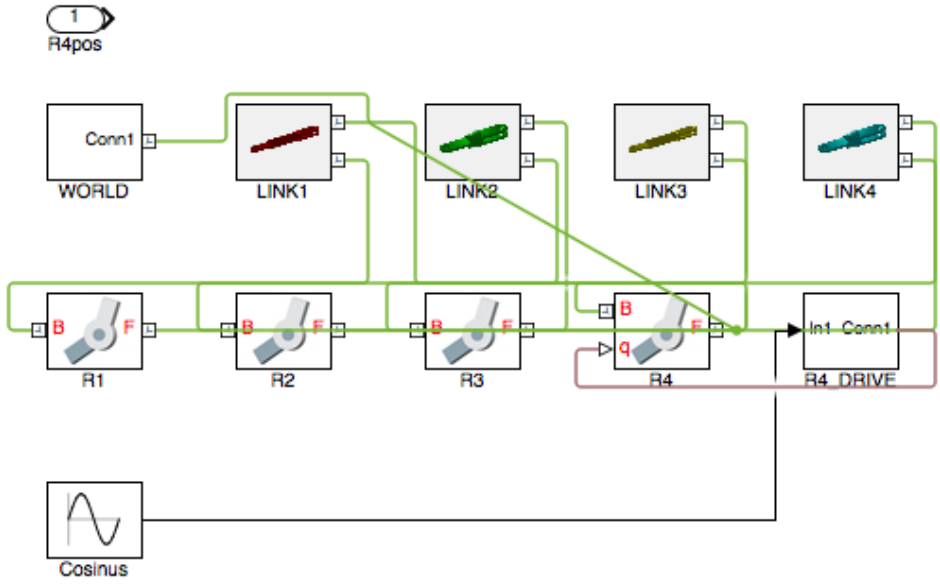
.....



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('%.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), '']});
imageVideoImagePage(FN,smbDrawNow);
```

```
Creating a new video file: '/Users/lueth/Desktop/imageVideoTitle.avi'
Creating a new video file: '/Users/lueth/Desktop/imageVideoEndtitle.avi'
Creating a new video file: '/Users/lueth/Desktop/imageVideoTextPage.avi'
Creating a new video file: '/Users/lueth/Desktop/imageVideoImagePage.avi'
```



8. Create Video Headers and Explaination

```
[I,FN]=smbVideoSimulation (10,'Video SG_LIB_EXP_25');
IT=imageVideoTitle(FN,{'SG-Lib Tutorial #25','Creating Videos Titles for SimMultiBody Videos','Tim C. Lu
eth','$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/lueth/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
```

```
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======================================== Used Matlab products: ========================================
image_toolbox
map_toolbox
```

```
matlab
robotics_system_toolbox
simmechanics
simscape
simulink
==================================================================================================
```

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