

Wednesday, May 2, 2012

spar design \ biplane - spar - const load \ untwisted

### Procedure for setting up a new biplane spar configuration

- make a new configuration folder:  $\rightarrow$  XX-bispar-rjXXX-gXXX
- Open MATLAB script: spar design \ DYMORE \ biplane NURBS.m

$\rightarrow$  change USER-DEFINED PARAMETERS

$$\begin{cases} g\_to\_c \\ jt\_end\_station \end{cases}$$

$\rightarrow$  run the script ... this will write \*\_curve.dat and \*\_mesh.dat and \*.dgp files to spar design \ DYMORE \ input-files

$\rightarrow$  save the figure as: XX-bispar-rjXXX-gXXX.fig  
(in the new configuration folder) and XX-bispar-rjXXX-gXXX.png

- Open Python script: spar design \ writeDYMOREfiles.py

$\rightarrow$  change parameters for each spar region

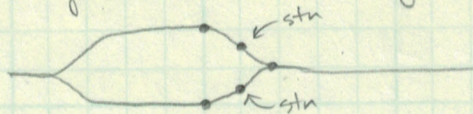
- STRAIGHT BIPLANE REGION, UPPER (CD)
- " " " LOWER (CH)
- JOINT TRANSITION REGION, UPPER (DE)
- " " " LOWER (HE)
- OUTBOARD MONOPLANE REGION (EF)

$\begin{cases} spar\_stn\_list \\ biplane\_flag\_list \end{cases}$

$\rightarrow$  run the script ... this will write \*\_props.dat files to spar design \ DYMORE \ input-files

- Open Excel file: spar design \ testmatrix.xlsx

$\rightarrow$  read "stn" under "curved beam parameters"  
this is the spar station that is in the middle of the joint transition region



if  $k_2$  is non-zero, you need to rerun the VABS input file for the cross-section at this spar station with the correct  $k_2$ -value

- Open a Windows command prompt

> cd "D:\data\2012-04-30 (biplane cross-sections with  $k_2$  curvature)"  
> copy spar\_station-XX.dat spar\_station-XX-- $k_2$ -XXXX.dat  
 $\underbrace{\hspace{1.5cm}}_{stn} \quad \underbrace{\hspace{1.5cm}}_{stn} \quad \underbrace{\hspace{1.5cm}}_{k_2 \times 1000}$



- Open VABS input file: "D:\data\2012-04-30\...\spar\_station\_XX-k2-XXXX.dat"  
 change curve\_flag to 1 in line 3  
 add the curvatures  $k_1$   $k_2$   $k_3$  on line 4  
                           ↑    ↑    ↑  
                           0.0 0.XXXX 0.0
- Open a Windows command prompt  
   > cd %spardesign%  
   > .\VABS\VABSI "D:\data\2012-04-30\...\spar\_station\_XX-k2-XXXX.dat"
- Open VABS output file: "D:\data\2012-04-30\...\spar\_station\_XX-k2-XXXX.dat.K"  
   → check that all diagonal entries in the Timoshenko stiffness matrix are positive  
   → copy output file to spardesign\VABS\cs-database\biplane\_curved\
- Open Python script: spardesign\DYMORE\makeSingleMKblock.py  
   → change parameters  
       { spar\_station  
       { dymoreMKfile  
       { vabsMK  
   → run the script  
   → copy the <dymoreMKfile> to the new configuration folder  
     • open the <dymoreMK file> and edit the @ETA\_COORDINATE to match "eta" in the "curved beam parameters" in testmatrix.xlsx
- Open Windows Explorer: spardesign\DYMORE\input\_files  
   → copy all the files in this folder to the new configuration folder:  
       spardesign\biplane\_spar\_constload\untwisted\XX-bispar\rjXXX-gXXX
- Open Windows Explorer: <new configuration folder>  
   → double-click openinputs-props.bat <sup>this will open gVim</sup>  
   → edit the beam properties of the middle spar station to match the contents of <dymoreMK file> (copy and paste)  
   → save all  
   → double-click run dymore.bat