

ESP Training Sessions 5 & 6 (June 14, 2021)
Muddy Cards

Can an array element be left blank?

no. not if you set whole array at once
yes. if you set elements one by one

Will the intersect resulting in a shell or wire or point still work as well as a solid body?

see INTERSECT's Help documentation

Is there an internal list of stored bodies that we can loop over to check all bodies against each other?

No. They are numbered sequentially, and you can interrogate them by SELECTing it. But there is currently no way of putting a Body onto the stack (unless you explicitly STOREd it)

Can you catch the error number instead of the string?

yes

If we are not sure of the number of iterations in a loop, and want to break out of the loop only using PATBREAK, how can we do this?

make the maximum number of iterations larger than you ever expect

The wing.csm solution from session03 seems to have some weird "wrinkles" on the leading edge. Is that just a rendition issue or would that be geometry provided to CFD? How to you "smooth it out"?

ESP generates a tessellation just for visualization. If you really want to use the ESP tessellation and you want it finer, you have at least two options:

1. use the UDPRIM applyTparams with factor < 1
2. put a .tParams ATTRIBUTE on SELECTed Edges or Faces

In the wing.csm solution, why is there a Mark? is it useful in this particular case?

In this case, the MARK is not really needed. But putting a MARK in this case is a good practice so that this block of code could be copied into another .csm file

Is it possible to use a mirror function in wing.csm?

yes

Is there a document which explains what are the primitives available and which parameter is necessary for each one? (for example naca)

press the Help button at look for section 5.5 (User-Defined Primitives shipped with OpenCSM)

How can I concatenate strings? This is not working for me:

```
"SET $overlap+val2str(partIdx) 1"
```

You should use `SET !$overlap+val2str(partIdx,0) 1`

Does changing the design parameters in the gui and rebuilding save changes back to the CSM file?

No. If you want to save these changes, use `ExportFeatureTree` (but beware that you will lose formatting, comments, etc.) It's probably better to use the internal code editor

For the 3rd example, do the args to `UDPRIM` override the existing `UDPARGs`?

The `UDPARG` and `UDPRIM` statements are processed in order, with overwriting if necessary

Are the NACA 4-digits closed at the trailing edge?

You can close it by setting `sharppte` to 1 (which changes the x^4 coefficient)

Can you import a csm file or do you have to use the csm command?

Use an `include-style UDC`

Would freeform be the best choice for reading a lower and upper surface from airfoil definition files, or would bezier be better?

Your best option is probably the `fitcurve UDP`

Is `UDP sew` recommended now that `COMBINE` can accept bodies back to `MARK`. What is the difference between `sew` and `COMBINE`?

There is a bit of history here. A few versions ago, `UDPRIM import` would only get one `Body` at a time, so reading all the `Bodys` and `COMBINING` them was a bit cumbersome, so the `UDPRIM sew` was created. Now, you can get all the `Bodys` in an `IMPORT` in one read (by setting `bodynum` to -1), so both approaches are essentially the same

Can you guide a `WireBody` (e.g. ellipse) that changes its own shape along the guiding path?

No, use `RULE` or `BLEND` instead

How can I set the working directory?

You cannot.

Can we write: `UDPRIM $/dumbell Lbar 5.0 Dball 1.0 Dbar 0.2` instead?

Yes

What is the difference between `RULE` and `C0 BLEND` ?

Currently `RULE` generates separate `Bsplines` in each interval and `BLEND` generates a single `Bspline` with multiple coincident knots. This can cause lots of problems, so the `BLEND` with `C0` will likely be implemented the same was as `RULE` in the future

If you made the root of the wing first, and then the tips, would you

be able to re-order how the rule goes about connecting the sections?
You will need to swap the order of Bodys in the Stack first

Could we use a group instead of specifying fuselage:noselist for the BLEND?

No, GROUP only applies to Bodys. Using the syntax "1;2;3" is the way of specifying a vector/matrix of values

If I just want the line intersection and not the surface, how can I do that?

INTERSECT the Face with another planar FACE. The BOX command is a convenient way of creating such a planar Face.

When you look up the branch that makes the waffle it has <<inline/xx>> as an argument for one of its variables, what is that?

Whenever, you use the << notation, OpenCSM actually writes an image of the file in memory.

Regarding dumbbell question: yes, you can use UDPARGs inline or use separate UDPARG statements.

The reason we have the UDPARG statement is because all statement in OpenCSM are limited to 9 arguments and there are cases when a UDP needs more than that. So the UDPARG statement is just a way of allowing more arguments

Are these recorded sessions available somewhere?

Yes, they are at acdl.mit.edu/ESP/training/ESP/lectures

How many Bodys can a UDF consume?

It can consume one, two, or all Bodys back to the Mark. It depends on the UDF

How can you create a UDP or UDF?

see EngSketchPad/doc/UDP_UDF/udp_udf.pdf, which are slides from a previous training course

Is there a way of limiting the scope of the exception handler (such as with a TRY statement)

no, but you could always make sure that there are no pending signals by CATBEG \$all

Are there mechanisms for "else" or "always" blocks in the exception handler?

no.

How are DESPMTR and CFGPMTR statements processed

During the load operation (sort of like compiling), the DESPMTRs and CFGPMTRs are defined. During the build operation (sort of like running), they are simply used. If you want to

change a value while building, you must use a local Parameter, which you can SET

I'm wondering if I can call a parameter which I used to define a body. Using your solution for the plate with holes as an example, we create a cylinder with CYLINDER ix*space iy*spaceetc. Is there a way for me to call say the 2nd parameter used to create the cylinder? Something like cylinder[2]?

no

What is the difference between @parameters and @@parameters
@parameters are set anytime a Body is created or after a SELECT statement

@@parameters are set anytime a UDP, UDF, or UDC is called
BTW, the reason they start with @ is because ESP does not allow a user to SET the value of any parameter that starts with @ (as a way of protecting a user from his/herself)

Will the muddy cards be accessible after the training?
yes. They are posted along with the lecture slides.

Why can't ESP not find the naca456 UDP?
If you are compiling for the source, you will need a FORTRAN compiler.

Is there a way of posting a message in the MessageWindow from within a .csm script?
Yes, starting in v1.19 there is a MESSAGE command that will do this

What is the sign convention for the rotation angles in the ROTATEX, ROTATEY, and ROTATEZ commands?
A positive rotation follows the right-hand rule

Can I start PATBEG at an index other than 1? Can I change the stride?
Not at this time, but this could be added in the future if there is a real need for it

How do you see the Help for a UDP?
See section 5.5 of the online Help. Also, look in data/basic/*.csm for examples of its use.

What is the benefit of an include-style UDC?
1. You can break a very long .csm script into more manageable pieces

2. You can break a .csm script into pieces that can be used more than once (either in the same script or different scripts)

What does contains.udc return?

By looking at the contains.udc file:

```
@@contains: 0 if Body1 is fully      within Body2
             1 if Body1 is not fully within Body2
             2 if Body1 is partially within Body2
             3 if Body1 is          outside Body2
```

What does overlaps.udc return?

By looking at the overlaps.udc file:

```
@@overlaps: 0 if Body1 and Body2 do not overlap
             1 if Body1 and Body2 do      overlap
```

I got an infinite loop when I set Dhole=4.0 in Ubracket.csm.

Thank you for bringing this to our attention. This will be fixed shortly.

Can you do an example where an error actually occurs and you can handle it?

overlaps.udc is a good example:

```
# overlaps.udc
#
# Body2 Body1 OVERLAPS Body2 Body1
#
# returns in @@overlaps: 0 if Body1 and Body2 do not overlap
#                       1 if Body1 and Body2 do      overlap
#
# written by John Dannenhoffer

INTERFACE overlaps  out  -1

STORE    overlaps 1
STORE    overlaps 2

# try to perform INTERSECTION
RESTORE  overlaps 1
RESTORE  overlaps 2
INTERSECT

SET      status    0
CATBEG   $did_not_create_body
SET      status    -1
CATEND

IFTHEN   status EQ 0
  STORE  .
  SET    overlaps 1
ELSE
  STORE  .
  STORE  .
```

```
    SET    overlaps 0  
ENDIF
```

```
# restore the stack to its original condition
```

```
RESTORE overlaps 2
```

```
RESTORE overlaps 1
```

```
END
```