

ESP Training Sessions 9 & 10 (June 18, 2021)
Muddy Cards

Is there a way to programmatically find the Edge/Face/Body with highest sensitivity magnitude for a given parameter variation?
This would be fairly easy to do in CAPS

In the past I have had trouble using design parameters in SET statements. When can/can't you include DESPMTRs in SET statements? What is the notation for a local variable? I can't seem to find it in the tutorial

SET can only be used with LocalVariables (or OUTPMTRs), not with DESPMTRs, CFGPMTRs, or CONPMTRs. BTW, a LocalVariable is defined by either a SET, PATBEG, or GETATTR statement.

I'm still confused over the ":" notation. Does ESP interpret ":" as anything other than a character in the string? Ex. wing:span and wing:chord? Does ESP see span and chord as being associated with wing in any way, or is this construct just for the user to keep track of organization of naming?

It is just a way of organizing variables in the ESP user interface. Colons in filenames are just ordinary characters.

I think I remember hearing that it's possible to take a parameterized ESP model and "fit" it to an existing geometry file (e.g an existing iges file of a wing you have from another source). Is this true? and if so how do you do it?

PLUGS is the tool you are looking for. The steps to using PLUGS include:
* generate a parametric model (ie, a model with DESPMTRs)
* generate a file with the cloud of points that you want to fit
* run: serveCSM -plugs 25 -plot fileWithPoints model.csm

See file in \$ESP_ROOT/data/Plugs for examples

Can the global XYZ orientation be changed in reference to the model if the coordinates do not agree with another program?

You can ROTATEX, ROTATEY, or ROTATEZ to get your model into any orientation.

Is there a way to tag all parameters when building the left wing and then do a mirror and string replace of left tags with right tags? Could this be done with a udc? Or what would be the best approach to doing this?

After you use the MIRROR command, try:
UDPRIM editAttr filename <<
FACE HAS tagComp=leftWing
SET tagComp=riteWing
>>

Is there a way to pan the sketch around?

Use the L, R, B, and T buttons (at the top of the TreeWindow)

Are there intrinsic attribute types built into ESP or are they all user defined?

Attributes whose names begin with a dot (.) or underscore (_) may be set and/or used by ESP. Any other attribute name is at the user's discretion

Is there a catalog of the special attribute names in the help guide or somewhere in the training material?

Yes, it is in the Help document and in training session 9

What are the units of tParams length and sag?

They are in the same units as the rest of the geometry.

Can Node attributes be viewed in ESP?

Node attributes are in the viewer: both by querying (^), and using DisplyFilter. Try toggling Nodes on and off and verify the issue persists.

Does the MIRROR option, instead of 360 degree REVOLVE, improve the surface tessellation of the body?

The surface tessellations are independent of the operations used to generate the geometry.

For tessellation, is it only possible with triangles? Is it possible to do tri & quad combination?

Yes. Put the _makeQuads attribute on the Body

Is it possible to extract the matrix of derivatives (dx/dP) to use it in other software? Is it in .sens files?

Yes. It is available in both pyOCSM or CAPS. Also look at the Cart3D design framework plugin (ESPxddm), found at \$ESP_ROOT/src/CAPS/aim/cart3d

Is tessellation sensitivity defined as a continuous function of t/uv or is it defined on the vertices of a discrete EGADS tess object?

It is defined at the tessellation points

I do not want to use an OpenSource Solver but a solver developed by my company. Can I use the .sens file?

Yes, that is why it was created.

What's inside the .sens files?

The header of the file contains the names and velocities of all the DesignParameters. This is then followed by tables that contain the sensitivities at the Nodes, followed by the Edges, and lastly followed by the Faces.

Do you know what filename is for the math on sensitivities that is in the distribution?

acdl.mit.edu/ESP/Publications/AIAApaper2015-1370.pdf "Design Sensitivity Calculations Directly on CAD-based Geometry", AIAA-2015-1370

Could you give just a little more detail on the control surface generation/parameterization?

This will be covered in the follow-on CAPS course.