# DASimpleFoam

[Shape variable](https://dafoam.github.io/mydoc_verifications_dasimplefoam.html#shape-variable)

[Angle of attack](https://dafoam.github.io/mydoc_verifications_dasimplefoam.html#angle-of-attack)

First, download the configuration files from [here](https://github.com/DAFoam/verifications), then go to the DASimpleFoam folder, and run the commends mentioned in the overview section.

For most of the cases, the adjoint matches the reference values by **14 significant digits**.

## Shape variable

dCD/dFFD variable 0 variable 1 variable 2

Forward AD Reference 0.009260839088106553 0.01047989656042717 0.02535943905573043

JacobianFree Adjoint 0.009260839088106503 0.01047989656042720 0.02535943905573065

dCL/dFFD variable 0 variable 1 variable 2

Forward AD Reference 0.2419525437248771 0.2002145064954005 0.2802869444676860

JacobianFree Adjoint 0.2419525437248756 0.2002145064953999 0.2802869444676880

dCM/dFFD variable 0 variable 1 variable 2

Forward AD Reference -0.2192473028507383 -0.2264587861502322 -0.2456468063599592

JacobianFree Adjoint -0.2192473028507387 -0.2264587861502318 -0.2456468063599599

## Angle of attack

dCD/dAOA variable 0

Forward AD Reference 0.001315555355365731

JacobianFree Adjoint 0.001315555355365766

dCL/dAOA variable 0

Forward AD Reference 0.09954288373144168

JacobianFree Adjoint 0.09954288373144177

dCM/dAOA variable 0

Forward AD Reference -0.001699253810007804

JacobianFree Adjoint -0.001699253810007761