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# **DPM-Euler coupling for Ansys Fluent**

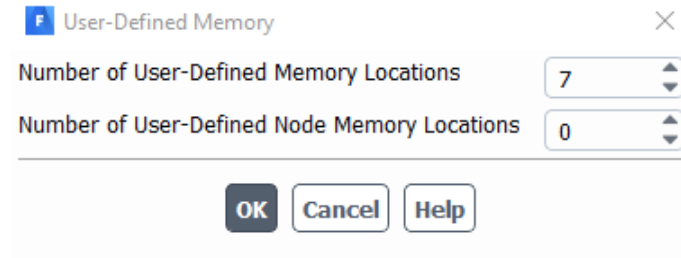
## **Manual**

Release 1.0

22.06.2021

## 1. Allocate User defined Memory (C UMDI)

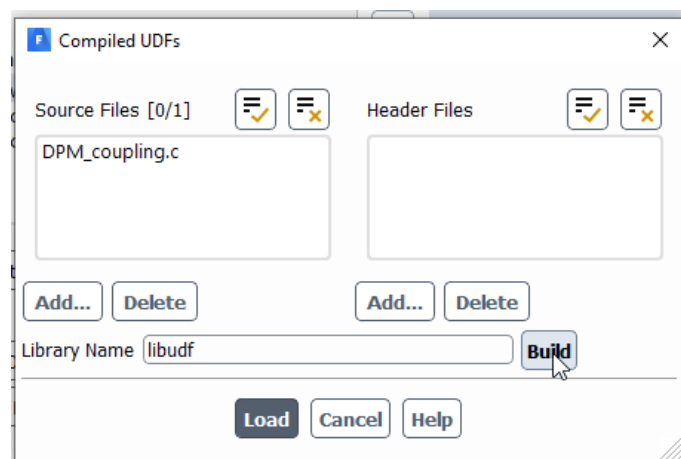
User-Defined->Memory...



Set Number of **User-Defined Memory Locations** to 7

## 2. Compile and load User defined function (UDF) in Fluent

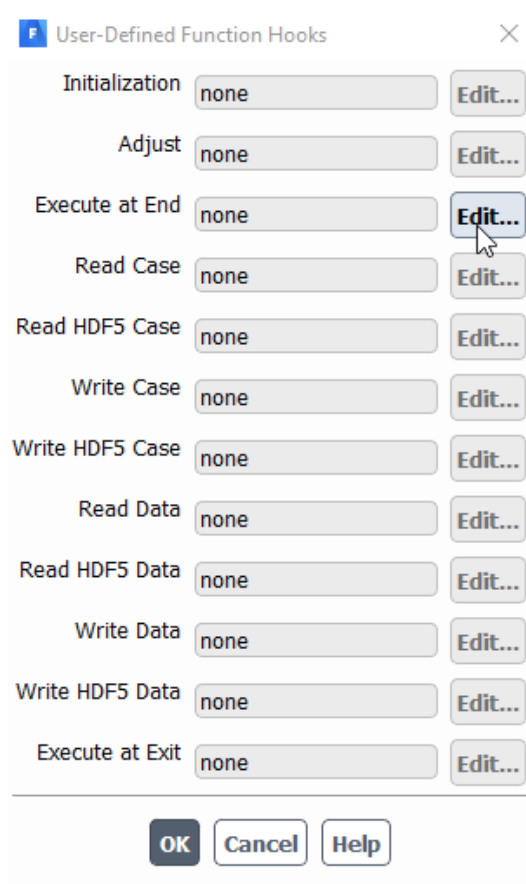
User-Defined->Functions->Compile



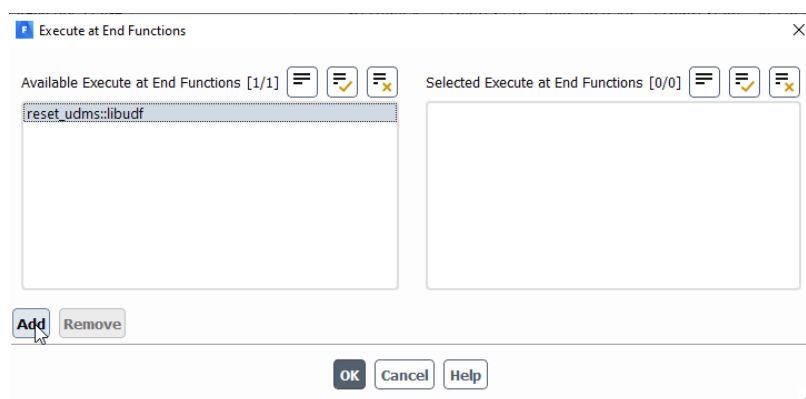
**Add** the \*.c file and click **Build** and **Load**

### 3. Hook reset\_udms

User-Defined->Functions->Function Hooks....



Add the UDF by clicking **Edit...** at Execute at End



Select reset\_udms::libudf and click **Add** and **OK**

## 4. Allocate Particle scalar memory

Setup->Discrete Phase->UDF Tab

The screenshot shows the 'Discrete Phase Model' dialog box with the 'UDF' tab selected. The 'Interaction' section has 'Interaction with Continuous Phase' and 'Update DPM Sources Every Flow Iteration' checked, with 'DPM Iteration Interval' set to 15. The 'Particle Treatment' section has 'Unsteady Particle Tracking' and 'Track with Fluid Flow Time Step' checked. Under 'Inject Particles at', 'Fluid Flow Time Step' is selected, with 'Particle Time Step Size (s)' at 0.001 and 'Number of Time Steps' at 1. A 'Clear Particles' button is present. The 'User-Defined Functions' section has all dropdowns set to 'none'. The 'User Variables' section has 'Number of Scalars' set to 3. At the bottom are buttons for 'OK', 'Injections...', 'DEM Collisions...', 'Cancel', and 'Help'.

Set Number of Scalars to 3.

## 5. Hook ForwardCoupling and MappingMain

Setup->Discrete Phase->UDF Tab

This screenshot shows the same 'UDF' tab as before, but with the 'Body Force' and 'Scalar Update' dropdown menus open. 'ForwardCoupling::libudf' is selected for 'Body Force'. For 'Scalar Update', the dropdown menu is open, showing 'MappingMain::libudf' as the selected option, with 'none' and 'MappingMain::libudf' also visible. The 'Source' dropdown is also open, showing 'none' and 'MappingMain::libudf'. The 'DPM Time Step' dropdown remains at 'none'. The 'Number of Scalars' is still set to 3.

Select MappingMain::libudf at **Scalar Update** and ForwardCoupling::libudf at **Body Force**

## 6. Hook udf zero drag

Setup->Discrete Phase->Injections...->Physical Models Tab

**Set Injection Properties**

Injection Name: injection-0      Injection Type: cone      Number of Streams: 5

**Particle Type**  
☐ Massless ☒ Inert ☐ Droplet ☐ Combusting ☐ Multicomponent

**Laws**  
☐ Custom

Material: press\_air      Diameter Distribution: uniform      Oxidizing Species:      Discrete Phase Domain: none

Evaporating Species:      Devolatilizing Species:      Product Species:

Point Properties    **Physical Models**    Turbulent Dispersion    Parcel    Wet Combustion    Components    UDF    Multiple Reactions

**Drag Parameters**      ☐ Rough Wall Model

Drag Law:  
spherical  
nonspherical  
Stokes-Cunningham  
high-Mach-number  
Ishii-Zuber  
Grace  
**udf\_zero\_drag::libudf**

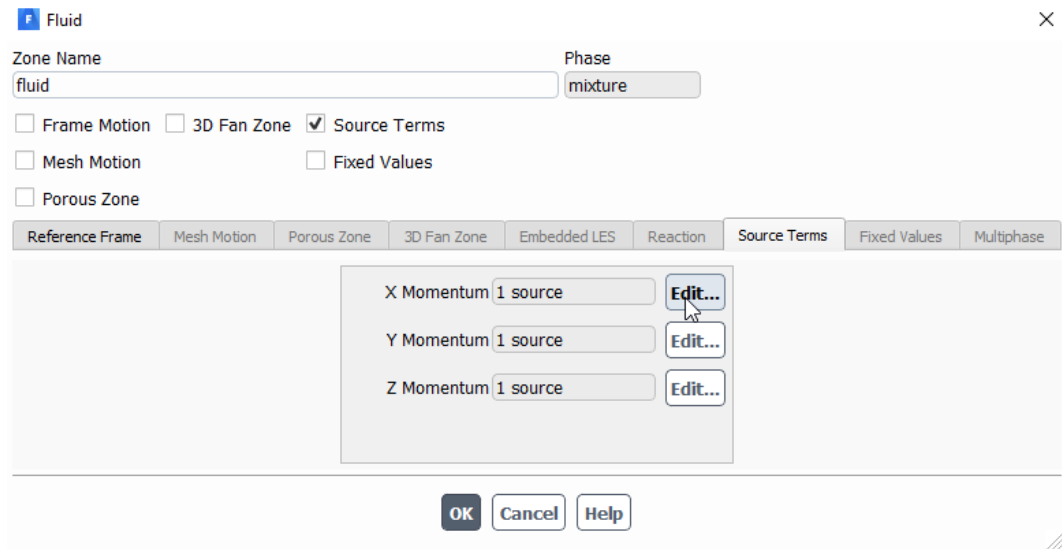
OK    File...    Cancel    Help

Select udf\_zero\_drag::libudf at **Drag Law**

## 7. Hook momentum sources

### Setup->Cell Zone Conditions->Fluid->Source Terms tap

(Make sure CELL\_ZONE\_ID\_FLUID in the source code is the same ID than in Fluent)



Make sure **Source Terms** is activated.

Click edit and choose correct UDF for each direction