

How to Create a Plane constrained to desired Cell Zone/s using the Plane Tool in ANSYS Fluent?

Description

The plane tool option in Fluent allows creation of planes bounded by points. However, none of the options in the plane tool allows to bound the plane by the selected cell zones.

Important

If the plane is to be created normal to a Cartesian co-ordinate, it is easy to create it through an "iso-surface" of *Mesh* > *Co-ordinate* bounded by the selected cell zones. Therefore, the solution presented in this document is primarily intended for arbitrarily inclined planes created using the Plane tool, typically created using the Three Points method.

Solution

Consider a plane created using the Plane tool option, which is cutting across two cell zones as shown below:

				Plane to be bounded by fluid-2 only - fluid-2
			-	fluid-1
Plane Surface			×	
New Surface Na	me			
plane				
Method				
Three Points	-			
Point 1				
X (m)	Y (m)	Z (m)		
0.010184	0.03079685	0.00722883	Select with Mouse	
Point 2				
X (m)	Y (m)	Z (m)		
0.01248738	0.02286387	-0.0003323	Select with Mouse	
Point 3				
X (m)	Y (m)	Z (m)		
0.00735153	0.0139815	-0.0100984	Select with Mouse	

Figure 1: Inclined plane created using the Three point method available in the Plane tool

To clip the plane to only "fluid-2" cell zone, following workaround can be used:

1. Invoke a UDM variable

<u>F</u> ile	Domain	Physics	User-Defined	Solut	tion Resu	lts		
Field Functio	ns fx	User D	oks	emory	Model Specific			
Parameters	Functions _▼	E→ Execute on	Demand Num	Jser-Defined I ber of User-E ber of User-E	Memory Defined Memory Loca Defined Node Memor	ations y Locations	1	×
					OK Cancel	Help		

2. Patch the UDM variable to unity only in the cell zones to which the plane is to be bounded

Patch			×
Reference Frame	Value		
Relative to Cell Zone	1	Zones to Patch Filter Text	
 Absolute 	Use Field Function	fluid-1	
		fluid-2	
Variable	Field Function		
Pressure			
X Velocity Y Velocity			
Z Velocity		Registers to Patch [0/0]	
Turbulent Kinetic Energy		5	
Specific Dissipation Rate			
User Memory 0			

Note: After patching, plotting the contours of UDM variable on the plane created earlier can be used to ascertain if the UDM value of unity represents the desired part of the plane to be clipped.



3. Create an iso-clip using the UDM variable on the plane surface

Iso-Clip		×
Name		
clipped-plane		
Clip to Values of		
User Defined Memory	·	Clip Surface Filter Text
User Memory 0		fluid-1 fluid-2 interface
JULIUM KE	JULIUM KE	interface-shadow outer
E E	I E	plane
The first	The second	
Min	Max	
0.5	1	

This gives the desired plane clipped to the selective cell zone "fluid-2".



Figure 2: Inclined plane clipped to cell zone "fluid-2"

Keywords: clipped plane; plane tool

Contributors: Vishesh Aggarwal