Offset surface creation

pMesh

Case 1

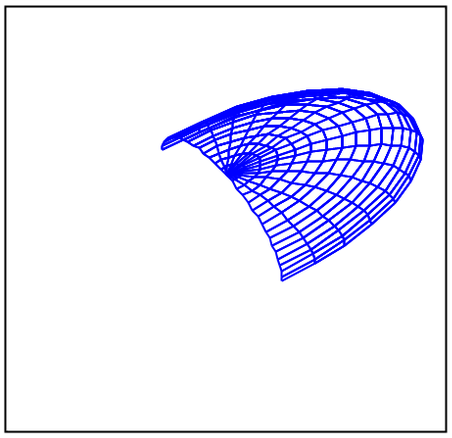
Solid between a surface and its displaced a fixed distance h in the direction of the surfaces normals

$$F_1(u, v) := \begin{bmatrix} 9 \cdot \sin(u) \cdot \cos(v) \\ 4.5 \cdot \sin(u) \cdot \sin(v) \\ 3 \cdot \cos(u) \end{bmatrix} \qquad U_1 := pRange(0.5 \cdot \pi, 0, 16) + 0 \qquad h_1 := 1$$

$$V_1 := pRange(1.5 \cdot \pi, 0.5 \cdot \pi, 16)$$

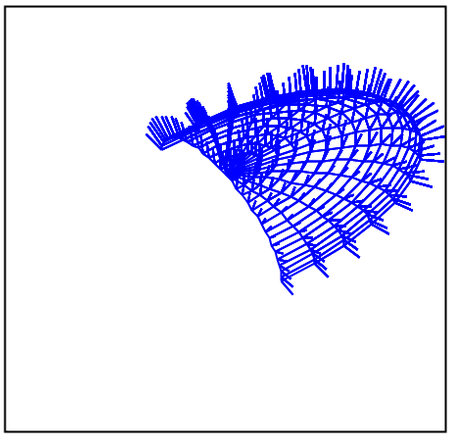
$$M_1 := pMesh(F_1, U_1, V_1)$$
$$N_1 := pNo(F_1, U_1, V_1)$$
$$MN_1 := pNoMesh(M_1, N_1, h_1)$$

The surface



$M_1 \cdot \gamma \cdot 1.2$

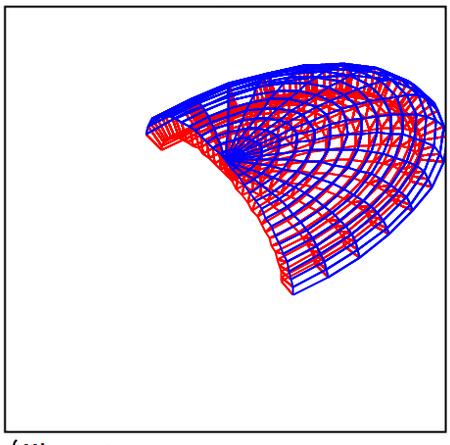
The surface with the normals



$MN_1 \cdot \gamma \cdot 1.2$

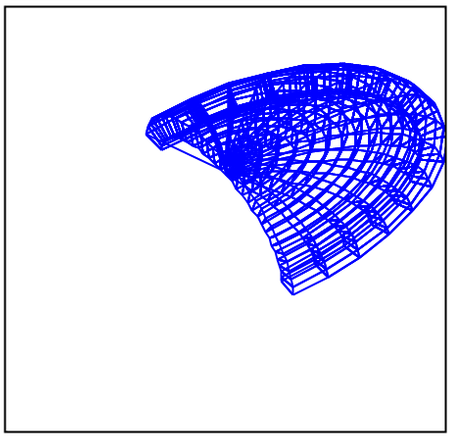
$$M'_1 := M_1 + h_1 \cdot N_1$$
$$A := stack(MN_1, M'_1)$$

Both toghether



$M'_1 \cdot \gamma \cdot 1.2$
$MN_1 \cdot \gamma \cdot 1.2$

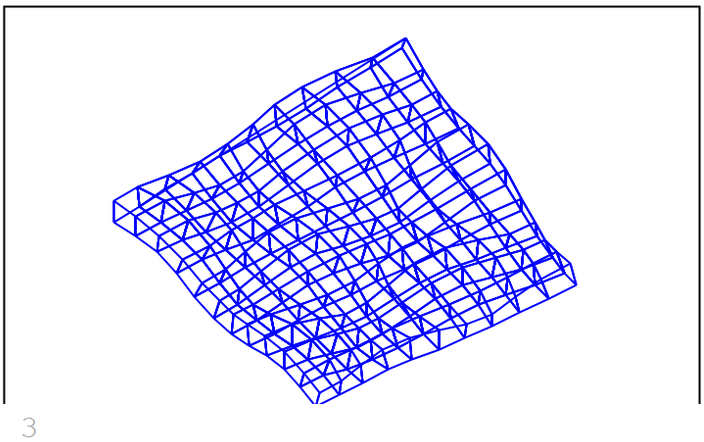
The Solid as only one matrix



$A \cdot \gamma \cdot 1.2$

Putting all toghether

$$F_2(u, v) := \begin{bmatrix} u \\ v \\ 0.3 \cdot \sin(u) \cdot \cos(v) \end{bmatrix}$$
$$U_2 := pRange(-5, 5, 10)$$
$$V_2 := pRange(-5, 5, 11)$$
$$B := pNoSolid(F_2, U_2, V_2, 0.8)$$



$B \cdot \gamma \cdot zum$

Case 2

Solid between a surface and its displaced a variable distance h(u,v) in the direction of the surface normals

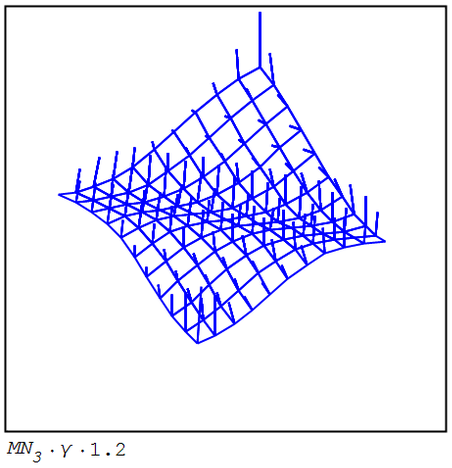
$$F_3(u, v) := \begin{bmatrix} u \\ v \\ \sin(0.5 \cdot u + 0.5 \cdot v) \end{bmatrix} \qquad U_3 := pRange(-5, 5, 10) \qquad V_3 := pRange(-5, 5, 10) \qquad h_3(u, v) := \sqrt{|u + v|}$$

For generating the same structure for the scalar function h.3 we use the following cheat

$$H_3(u, v) := |\text{matrix}(3, 1) + h_3(u, v) \qquad h_3 := pMesh("H.3", U_3, V_3)$$

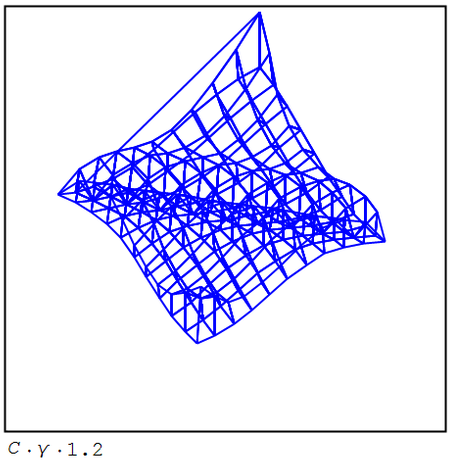
$$M_3 := pMesh(F_3, U_3, V_3)$$
$$N_3 := pNo(F_3, U_3, V_3)$$
$$MN_3 := pNoMesh(M_3, N_3, h_3)$$
$$M'_3 := \overrightarrow{M_3 + h_3 \cdot N_3}$$
$$C := \text{stack}(MN_3, M'_3)$$

The surface with the normals



$MN_3 \cdot \gamma \cdot 1.2$

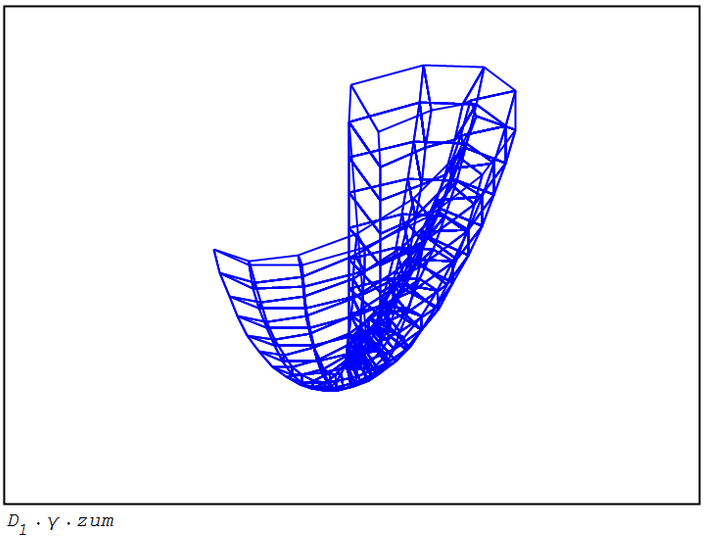
The Solid



$C \cdot \gamma \cdot 1.2$

Putting all toghether

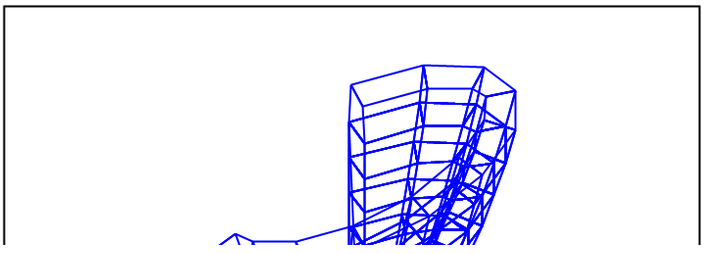
$$h_4(u, v) := 0.5 \cdot v$$
$$F_4(u, v) := \begin{bmatrix} 2 \cdot u \cdot \cos(v) \\ 1 \cdot u \cdot \sin(v) \\ u^2 - 5 \end{bmatrix}$$
$$U_4 := pRange(0.3, 3, 10)$$
$$V_4 := pRange(1.4 \cdot \pi, 0, 10)$$
$$D_1 := pNoSolid(F_4, U_4, V_4, h_4)$$

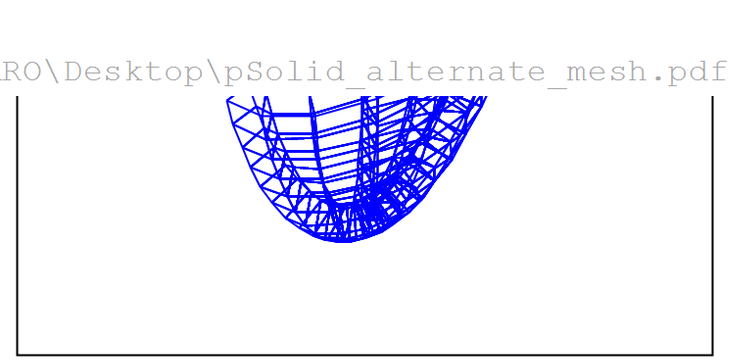


$D_1 \cdot \gamma \cdot zum$

Compare it with the "not distorted" solid

$$D_2 := pNoSolid(F_4, U_4, V_4, 1)$$





$D_2 \cdot \gamma \cdot zum$