

Minkowski Sum blank.ggb

File Edit View Options Tools Window Help

Sign in

Algebra Graphics 3D Graphics

create point in plan
Point in Plan View, Point Elevation

Algebra view

Polygon

2D view 1
(for plan and elevation of the original polyedral Airy stress function)

2D view 2
(for the projections of the polar polyhedron and of the Minkowski Sum)

3D view
(the polarity paraboloid is shown as an illustration)

Input

Minkowski Sum blank.ggb

File Edit View Options Tools Window Help

Sign in

Algebra Graphics Graphics 2 3D Graphics

Point
● A = (1.65, -1.76)
Polygon

1st click:
Point in plan view

Input:

The screenshot displays the GeoGebra interface with four main views: Algebra, Graphics, Graphics 2, and 3D Graphics. The Algebra view on the left shows a point A with coordinates (1.65, -1.76). The Graphics view shows a 2D coordinate system with a red circle around point A. The Graphics 2 view shows an empty 2D coordinate system. The 3D Graphics view shows a grey dome-like shape with point A on its surface. The text '1st click: Point in plan view' is overlaid on the Graphics view. The bottom of the window has an 'Input:' field.

Minkowski Sum blank.ggb

File Edit View Options Tools Window Help

Sign in

Algebra Graphics Graphics 2 3D Graphics

Boolean Value
 AvComp = false

List
 AvInst = {"SetPointSize(A_...
 AvInst2 = {}

Number
 tag = 1

Point
 A = (1.65, -1.76, 2.2)
 A_e = (1.65, 2.2)
 A_z = (4.01, 2.2)
 A_{xy} = (1.65, -1.76)

Polygon

Text
 Av3D = "A"
 AvA = "A_{xy}"
 AvB = "A_z"
 AvC = ""
 AvD = ""
 AvElev = "A_e"
 AvExternalFace = ""
 AvFP = ""
 AvFPcir = ""
 AvFPsort = ""
 AvFaProj = ""
 AvFadj = ""
 AvInternPt = ""
 AvInternPtNb = ""
 AvInternRec = ""
 AvMin Seg = ""
 AvMin SegFa = ""
 AvNm = ""
 AvOneFacePt = ""
 AvOneFaceRec = ""

2nd click:
Point in elevation view

Point in 3D

Input: _____

Minkowski Sum blank.ggb

File Edit View Options Tools Window Help Sign in

Algebra Graphics Graphics 2 3D Graphics

Boolean Value
 AvComp = false

List
 AvInst = {"SetPointSize(D...
 AvInst2 = {}

Number
 tag = 1

Point
 A = (1.65, -1.76, 2.2)
 A_e = (1.65, 2.2)
 A_z = (4.01, 2.2)
 A_{xy} = (1.65, -1.76)
 B = (3.44, -4.05, 1.89)
 B_e = (3.44, 1.89)
 B_z = (5.9, 1.89)
 B_{xy} = (3.44, -4.05)
 C = (5.02, -1.6, 3.43)
 C_e = (5.02, 3.43)
 C_z = (6.53, 3.43)
 C_{xy} = (5.02, -1.6)
 D = (3.73, -2.2, 5.92)
 D_e = (3.73, 5.92)
 D_z = (5.83, 5.92)
 D_{xy} = (3.73, -2.2)

Polygon
 Av3D = "D"
 AvA = "D_{xy}"
 AvB = "D_z"
 AvC = ""
 AvD = ""

Input: _____

Define points as you need
(can be added later also)

Minkowski Sum blank.ggb

File Edit View Options Tools Window Help

add point to face
point in plan or 3D

Boolean Value
 AvComp = false

List
 AvInst = {"If(AvComp, SetV
 AvInst2 = {}
 Face1 = {"D", "B"}

Number
 tag = 1

Point
 A = (1.65, -1.76, 2.2)
 A_e = (1.65, 2.2)
 A_z = (4.01, 2.2)
 A_{xy} = (1.65, -1.76)
 B = (3.44, -4.05, 1.89)
 B_e = (3.44, 1.89)
 B_z = (5.9, 1.89)
 B_{xy} = (3.44, -4.05)
 C = (5.02, -1.6, 3.43)
 C_e = (5.02, 3.43)
 C_z = (6.53, 3.43)
 C_{xy} = (5.02, -1.6)
 D = (3.73, -2.2, 5.92)
 D_e = (3.73, 5.92)
 D_z = (5.83, 5.92)
 D_{xy} = (3.73, -2.2)

Polygon
 F1 = 0
 Fe1 = 0
 f1 = 0

Text
 Av3D = "D"

Graphics

3D Graphics

Input

Add point to face

Define a face by linking points (points can be selected in plan, in 3D or in algebra view)

Minkowski Sum blank.ggb

File Edit View Options Tools Window Help Sign in

Algebra Graphics Graphics 2 3D Graphics

Boolean Value
 AvComp = true

List
 AvInst = {"If(AvComp,SetV
 AvInst2 = {}
 Face1 = {"D", "B", "C"}

Number
 tag = 2

Point
 A = (1.65, -1.76, 2.2)
 A_e = (1.65, 2.2)
 A_z = (4.01, 2.2)
 A_{xy} = (1.65, -1.76)
 B = (3.44, -4.05, 1.89)
 B_e = (3.44, 1.89)
 B_z = (5.9, 1.89)
 B_{xy} = (3.44, -4.05)
 C = (5.02, -1.6, 3.43)
 C_e = (5.02, 3.43)
 C_z = (6.53, 3.43)
 C_{xy} = (5.02, -1.6)
 D = (3.73, -2.2, 5.92)
 D_e = (3.73, 5.92)
 D_z = (5.83, 5.92)
 D_{xy} = (3.73, -2.2)

Polygon
 F1 = 1.11
 Fe1 = 2.95
 f1 = 4.72

Text
 Av3D = "D"

Input: _____

Close the polygon by clicking again on the 1st point

Minkowski Sum blank.ggb

File Edit View Options Tools Window Help Sign in

Algebra Graphics Graphics 2 3D Graphics

Boolean Value

- AvComp = true

List

- AvInst = {"If(AvComp, SetV
- AvInst2 = {}
- Face1 = {"D", "B", "C"}
- Face2 = {"D", "C", "A"}
- Face3 = {"D", "B", "A"}
- Face4 = {"A", "C", "B"}

Number

- tag = 5

Point

- A = (1.65, -1.76, 2.2)
- A_e = (1.65, 2.2)
- A_z = (4.01, 2.2)
- A_{xy} = (1.65, -1.76)
- B = (3.44, -4.05, 1.89)
- B_e = (3.44, 1.89)
- B_z = (5.9, 1.89)
- B_{xy} = (3.44, -4.05)
- C = (5.02, -1.6, 3.43)
- C_e = (5.02, 3.43)
- C_z = (6.53, 3.43)
- C_{xy} = (5.02, -1.6)
- D = (3.73, -2.2, 5.92)
- D_e = (3.73, 5.92)
- D_z = (5.83, 5.92)
- D_{xy} = (3.73, -2.2)

Polygon

- F1 = 1.11
- F2 = 0.9

Define all the faces
you need

Input: _____

Minkowski Sum blank.ggb

File Edit View Options Tools Window Help Sign in

Algebra Graphics **Add Face to Polyhedra** 3D Graphics

polygon with 1 letter before the number

Boolean Value

- AvComp = true

List

- AvInst = {"If(AvComp, SetV
- AvInst2 = {}
- Face1 = {"D", "B", "C"}
- Face2 = {"D", "C", "A"}
- Face3 = {"D", "B", "A"}
- Face4 = {"A", "C", "B"}

Number

- tag = 5

Point

Polygon

- F1 = 1.11
- F2 = 0.9
- F3 = 1.99
- F4 = 4.01
- Fe1 = 2.95
- Fe2 = 4.97
- Fe3 = 3.65
- Fe4 = 1.63
- f1 = 4.72
- f2 = 5.09
- f3 = 6
- f4 = 4.54

Text

- Av3D = "D"
- AvA = "A"
- AvB = "D_z"
- AvC = ""
- AvD = ""
- AvElev = "D_e"
- AvExternalFace = ""
- AvFP = ""
- AvFPcir = ""
- AvFDext = ""

Bring all these faces
in a polyhedron

Input: _____

Minkowski Sum blank.ggb

File Edit View Options Tools Window Help

Sign in

Algebra Graphics Graphics 2 3D Graphics

Boolean Value
 AvComp = true

List
 AvInst = {"NbFa1=Length(
 AvInst2 = {}
 FaNm1 = {"Face1"}
 Face1 = {"D", "B", "C"}
 Face2 = {"D", "C", "A"}
 Face3 = {"D", "B", "A"}
 Face4 = {"A", "C", "B"}
 Polyhedron1 = {4.72}

Number
 NbFa1 = 1
 polytag = 1
 tag = 5

Point
 Polygon

- F1 = 1.11
- F2 = 0.9
- F3 = 1.9
- F4 = 4.01
- Fe1 = 2.95
- Fe2 = 4.97
- Fe3 = 3.65
- Fe4 = 1.63
- f1 = 4.72
- f2 = 5.09
- f3 = 6
- f4 = 4.54

Text
 Av3D = "NbFa1"
 AvA = "Face1"
 AvB = "Polyhedron1"
 AvC = ""
 AvD = ""
 AvElev = "D, a"

Triangle F1: Polygon Zip(Object(a_{xy}"), a, Face1)

by clicking on faces in plan, in 3D or in algebra view.

Input: _____

Minkowski Sum blank.ggb

File Edit View Options Tools Window Help Sign in

Algebra Graphics Graphics 2 3D Graphics

- Boolean Value
 - AvComp = true
- List
 - AvInst = {}
 - AvInst2 = {}
 - FaNm1 = {"Face2", "Face3", "Face4", "Face1"}
 - Face1 = {"D", "B", "C"}
 - Face2 = {"D", "C", "A"}
 - Face3 = {"D", "B", "A"}
 - Face4 = {"A", "C", "B"}
 - Polyhedron1 = {5.09, 6, 4.54, 4.72}
- Number
 - NbFa1 = 4
 - polytag = 1
 - tag = 5
- + Point
- Polygon
 - F1 = 1.11
 - F2 = 0.9
 - F3 = 1.99
 - F4 = 4.01
 - Fe1 = 2.95
 - Fe2 = 4.97
 - Fe3 = 3.65
 - Fe4 = 1.63
 - f1 = 4.72
 - f2 = 5.09
 - f3 = 6
 - f4 = 4.54
- Text
 - Av3D = "NbFa1"
 - AvA = "Face1"
 - AvB = "Polyhedron1"
 - AvC = ""
 - AvD = ""
 - AvElev = "D_e"
 - AvExternalFace = ""

List FaNm1

Input

If you click on a face already included it is removed. (on/off)

So you can change your mind.

Minkowski Sum blank.ggb

File Edit View Options Tools Window Help

Sign in

Algebra Graphics Graphics 2 3D Graphics

Boolean Value
 AvComp = true

List
 AvInst = {}
 AvInst2 = {}
 FaNm1 = {"Face2", "Face3", "Face4", "Face1"}
 Face1 = {"D", "B", "C"}
 Face2 = {"D", "C", "A"}
 Face3 = {"D", "B", "A"}
 Face4 = {"A", "C", "B"}
 Polyhedron1 = {5.09, 6, 4.54, 4.72}

Number
 NbFa1 = 4
 polytag = 1
 tag = 5

Point

Polygon
 F1 = 1.11
 F2 = 0.9
 F3 = 1.99
 F4 = 4.01
 Fe1 = 2.95
 Fe2 = 4.97
 Fe3 = 3.65
 Fe4 = 1.63
 f1 = 4.72
 f2 = 5.09
 f3 = 6
 f4 = 4.54

Text
 Av3D = "NbFa1"
 AvA = "Face1"
 AvB = "Polyhedron1"
 AvC = ""
 AvD = ""
 AvElev = "D_e"
 AvExternalFace = ""

Input

List Polyhedron1: Zip(Polygon(a), a, Zip(Zip(Object(a), a, Object(b)), b, FaNm1))

The polyhedron is a list of polygons

Minkowski Sum blank.ggb

File Edit View Options Tools Window Help

Sign in

Algebra Graphics polar polyhedron 3D Graphics

Boolean Value

- AvComp = true

List

- AvInst = {}
- AvInst2 = {}
- FaNm1 = {"Face2", "Face3", "Face4", "Face1"}
- Face1 = {"D", "B", "C"}
- Face2 = {"D", "C", "A"}
- Face3 = {"D", "B", "A"}
- Face4 = {"A", "C", "B"}
- Polyhedron1 = {5.09, 6, 4.54, 4.72}

Number

- NbFa1 = 4
- polytag = 1
- tag = 5

Point

Polygon

- F1 = 1.11
- F2 = 0.9
- F3 = 1.99
- F4 = 4.01
- Fe1 = 2.95
- Fe2 = 4.97
- Fe3 = 3.65
- Fe4 = 1.63
- f1 = 4.72
- f2 = 5.09
- f3 = 6
- f4 = 4.54

Text

- Av3D = "NbFa1"
- AvA = "Face1"
- AvB = "Polyhedron1"
- AvC = ""
- AvD = ""
- AvElev = "D_e"
- AvExternalFace = ""

Input

Graphics

3D Graphics

Create the polar polyhedron by clicking on "polar polyhedron" tool and then on the list of faces names (not the list of faces).

Be patient. Tables are created and it takes several seconds.

Minkowski Sum blank.ggb

File Edit View Options Tools Window Help

Algebra Graphics polar polyhedron list of faces names 3D Graphics

Boolean Value
 AvComp = true

List

- AvInst = {"SetLineThickness(1,0)", "SetLineThickn
- AvInst2 = {"Repeat(NbPt1,Execute(AvInst))"}
- FP1 = $\begin{pmatrix} 1 & ? & 3 & 4 \\ 1 & 2 & ? & 4 \\ 1 & 2 & 3 & ? \\ ? & 2 & 3 & 4 \end{pmatrix}$
- FPsort1 = $\begin{pmatrix} 4 & 3 & 1 \\ 4 & 2 & 1 \\ 1 & 3 & 2 \\ 4 & 2 & 3 \end{pmatrix}$
- Fa1 = {"D", "C", "A"}, {"D", "B", "A"}, {"A", "C", "B
- FaNm1 = {"Face2", "Face3", "Face4", "Face1"}
- Face1 = {"D", "B", "C"}
- Face2 = {"D", "C", "A"}
- Face3 = {"D", "B", "A"}
- Face4 = {"A", "C", "B"}
- PF1 = $\begin{pmatrix} 1 & 2 & 3 & ? \\ ? & 2 & 3 & 4 \\ 1 & ? & 3 & 4 \\ 1 & 2 & ? & 4 \end{pmatrix}$
- PFshort1 = $\begin{pmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \\ 1 & 3 & 4 \\ 1 & 2 & 4 \end{pmatrix}$
- Padj1 = {{{4, 2}, {2, 3}, {3, 1}}, {{4, 4}, {3, 3}, {1, 2}},
- PolFa1 = {14.64, 24.68, 53.74, 89.68}
- PolFaLabel1 = {"A", "B", "C", "D"}
- PolPt1 = {(-0.62, 5.5, 8.49), (-2.18, -1.84, -1.84), (-0.3
- PolPtLabel1 = {"2", "3", "4", "1"}
- Polyhedron1 = {5.09, 6, 4.54, 4.72}
- Pt1 = {(1.65, -1.76, 2.2), (3.44, -4.05, 1.89), (5.02, -1.6

Input

The polar polyhedron is created, visible in 3D, with polar faces and polar points labeled.

All these objects are geogebra lists and can be manipulated and edited.

The paraboloid plays no role in the algorithm and is just here as an illustration.

The screenshot displays the GeoGebra interface with three main panels. The left panel, titled 'Algebra', contains a list of mathematical objects including matrices (FP1, FPsort1, PF1, PFshort1), sets of faces (Fa1, FaNm1, Face1-4), lists of points (PolPt1), and a list of faces (PolFa1). The middle panel, 'Graphics', shows two 2D projections of a polyhedron: a top view with vertices labeled A_e, B_e, C_e, D_e and a bottom view with vertices labeled A_{xy}, B_{xy}, C_{xy}, D_{xy}. The right panel, '3D Graphics', shows a 3D perspective view of a grey paraboloid with a brown polyhedron on its surface. The polyhedron's faces are labeled A, B, C, and D, and its vertices are labeled 1, 2, 3, 4. A 'polar polyhedron' window is open, showing a list of faces names.

Minkowski Sum blank.ggb

File Edit View Options Tools Window Help

Sign in

Algebra Graphics Graphics 2 3D Graphics

Boolean Value
 AvComp = true

List
 AvInst = {"SetLineThickness(1,0)", "SetLineThickn"}
 AvInst2 = {"Repeat(NbPt1,Execute(AvInst))"}
 FP1 = $\begin{pmatrix} 1 & ? & 3 & 4 \\ 1 & 2 & ? & 4 \\ 1 & 2 & 3 & ? \\ ? & 2 & 3 & 4 \end{pmatrix}$
 FPsort1 = $\begin{pmatrix} 4 & 3 & 1 \\ 4 & 2 & 1 \\ 1 & 3 & 2 \\ 4 & 2 & 3 \end{pmatrix}$
 Fa1 = {"D", "C", "A"}, {"D", "B", "A"}, {"A", "C", "B"}
 FaNm1 = {"Face2", "Face3", "Face4", "Face1"}
 Face1 = {"D", "B", "C"}
 Face2 = {"D", "C", "A"}
 Face3 = {"D", "B", "A"}
 Face4 = {"A", "C", "B"}
 PF1 = $\begin{pmatrix} 1 & 2 & 3 & ? \\ ? & 2 & 3 & 4 \\ 1 & ? & 3 & 4 \\ 1 & 2 & ? & 4 \end{pmatrix}$
 PFshort1 = $\begin{pmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \\ 1 & 3 & 4 \\ 1 & 2 & 4 \end{pmatrix}$
 Padj1 = {{{4, 2}, {2, 3}, {3, 1}}, {{4, 4}, {3, 3}, {1, 2}}}
 PolFa1 = {14.64, 24.68, 53.74, 89.68}
 PolFaLabel1 = {"A", "B", "C", "D"}
 PolPt1 = {(-0.62, 5.5, 8.49), (-2.18, -1.84, -1.84), (-0.3
 PolPtLabel1 = {"2", "3", "4", "1"}
 Polyhedron1 = {5.09, 6, 4.54, 4.72}
 Pt1 = {(1.65, -1.76, 2.2), (3.44, -4.05, 1.89), (5.02, -1.6

List FaNm1

Graphics: 3D view of a tetrahedron with vertices labeled A_e, B_e, C_e, D_e.

Graphics 2: 2D projection of the tetrahedron with vertices labeled A_{xy}, B_{xy}, C_{xy}, D_{xy}.

3D Graphics: 3D view showing the Minkowski sum of the tetrahedron and its polar, resulting in a shaded gray volume.

To get the Minkowski Sum of the projection of the polyhedron with the projection of its polar, click on the tool "Minkowski Sum" and then on the list of names of the polyhedron.

Input:

Minkowski Sum blank.ggb

File Edit View Options Tools Window Help

Sign in

Algebra Graphics Graphics 2 3D Graphics

Boolean Value
 AvComp = true

List

- AvInst = {"SetPointSize(OneFacePt1,1)", "SetColor
- AvInst2 = {"Repeat(NbFa1,Execute(AvInst))"}
- FP1 = $\begin{pmatrix} 1 & ? & 3 & 4 \\ 1 & 2 & ? & 4 \\ 1 & 2 & 3 & ? \\ ? & 2 & 3 & 4 \end{pmatrix}$
- FPcirt = {{{2, 1}, {3, 3}, {4, 4}, {2, 1}}, {{1, 1}, {3, 2},
- FPsort1 = $\begin{pmatrix} 4 & 3 & 1 \\ 4 & 2 & 1 \\ 1 & 3 & 2 \\ 4 & 2 & 3 \end{pmatrix}$
- Fa1 = {"D", "C", "A"}, {"D", "B", "A"}, {"A", "C", "B
- FaNm1 = {"Face2", "Face3", "Face4", "Face1"}
- FaProj1 = {0.9, 1.99, 4.01, 1.11}
- Face1 = {"D", "B", "C"} **List FaNm1**
- Face2 = {"D", "C", "A"}
- Face3 = {"D", "B", "A"}
- Face4 = {"A", "C", "B"}
- Fadj1 = {{{2, 1}, {3, 3}, {4, 4}}, {{1, 1}, {3, 2}, {4, 4}},
- InternPt1 = {{{(3.44, -4.05, 0)}, (3.44, -4.05, 0)}, (5.02,
- InternPtNb1 = {2}
- InternRec1 = {{0, 0, 0}}
- MinSeg1 = {{{(1, 2), {2, 3}}, {{1, 3}, {3, 1}}, {{1, 4}, {1
- MinSegFa1 = {{{(1, 3), {1, 3}}, {{1, 4}, {3, 4}}, {{1, 2},
- OneFacePt1 = {{{(1.65, -1.76, 0)}, (1.65, -1.76, 0)}, (5.0,
- OneFaceRec1 = {0, 0, 0}
- PF1 = $\begin{pmatrix} 1 & 2 & 3 & ? \\ ? & 2 & 3 & 4 \\ 1 & ? & 3 & 4 \\ 1 & 2 & ? & 4 \end{pmatrix}$
- $\begin{pmatrix} 1 & 2 & 3 \\ ? & ? & 4 \end{pmatrix}$

Graphics: 3D tetrahedron with vertices A_e, B_e, C_e, D_e and its 2D projection.

Graphics 2: Scale1 = 0, ExternalFace1 = 1. 2D projection of the polar polyhedron.

3D Graphics: 3D visualization of the Minkowski Sum, showing the original tetrahedron and its sum with another object.

This is the projection of the polar polyhedron

This is the Minkowski Sum

Input:

Minkowski Sum blank.ggb

File Edit View Options Tools Window Help Sign in

Algebra Graphics Graphics 2 3D Graphics

Boolean Value
 AvComp = true

List

- AvInst = {"SetPointSize(OneFacePt1,1)", "SetColor
- AvInst2 = {"Repeat(NbFa1,Execute(AvInst))" }
- FP1 =
$$\begin{pmatrix} 1 & ? & 3 & 4 \\ 1 & 2 & ? & 4 \\ 1 & 2 & 3 & ? \\ ? & 2 & 3 & 4 \end{pmatrix}$$
- FPCir1 = {{{2, 1}, {3, 3}, {4, 4}, {2, 1}}, {{1, 1}, {3, 2},
- FPsort1 =
$$\begin{pmatrix} 4 & 3 & 1 \\ 4 & 2 & 1 \\ 1 & 3 & 2 \\ 4 & 2 & 3 \end{pmatrix}$$
- Fa1 = {"D", "C", "A"}, {"D", "B", "A"}, {"A", "C", "B
- FaNm1 = {"Face2", "Face3", "Face4", "Face1"}
- FaProj1 = {0.65, 1.44, 2.89, 0.8}
- Face1 = {"D", "B", "C"}
- Face2 = {"D", "C", "A"}
- Face3 = {"D", "B", "A"}
- Face4 = {"A", "C", "B"}
- Fadj1 = {{{2, 1}, {3, 3}, {4, 4}}, {{1, 1}, {3, 2}, {4, 4},
- InternPt1 = {{{(3.4, -3.84, 0), (2.87, -3.51, 0), (4.21, -1
- InternPtNb1 = {2}
- InternRec1 = {{1.55, 0.86, 1.29}}
- MinSeg1 = {{{(1, 2), {2, 3}}, {{1, 3}, {3, 1}}, {{1, 4}, {1
- MinSegFa1 = {{{(1, 3), {1, 3}}, {{1, 4}, {3, 4}}, {{1, 2},
- OneFacePt1 = {{{(1.31, -0.67, 0), (1.35, -1.56, 0), (4.2
- OneFaceRec1 = {2.54, 1.63, 2.03}
- PF1 =
$$\begin{pmatrix} 1 & 2 & 3 & ? \\ ? & 2 & 3 & 4 \\ 1 & ? & 3 & 4 \\ 1 & 2 & ? & 4 \end{pmatrix}$$
- $$\begin{pmatrix} 1 & 2 & 3 \\ ? & ? & 4 \end{pmatrix}$$

Graphics: 3D tetrahedron with vertices A_e, B_e, C_e, D_e and axes A_{xy}, B_{xy}, D_{xy} .

Graphics 2: 2D projections of the tetrahedron. Includes sliders for $Scale1 = 0.15$ and $ExternalFace1 = 1$ (Number Scale1).

3D Graphics: 3D view of the tetrahedron and its projections onto a plane.

You can change the relative scale of both projections

Input: _____

Minkowski Sum blank.ggb

File Edit View Options Tools Window Help

Sign in

Algebra Graphics Graphics 2 3D Graphics

Boolean Value
 AvComp = true

List

- AvInst = {"SetPointSize(OneFacePt1,1)", "SetColor
- AvInst2 = {"Repeat(NbFa1,Execute(AvInst))" }
- FP1 = $\begin{pmatrix} 1 & ? & 3 & 4 \\ 1 & 2 & ? & 4 \\ 1 & 2 & 3 & ? \\ ? & 2 & 3 & 4 \end{pmatrix}$
- FPcir1 = {{{2, 1}, {3, 3}, {4, 4}, {2, 1}}, {{1, 1}, {3, 2},
- FPsort1 = $\begin{pmatrix} 4 & 3 & 1 \\ 4 & 2 & 1 \\ 1 & 3 & 2 \\ 4 & 2 & 3 \end{pmatrix}$
- Fa1 = {"D", "C", "A"}, {"D", "B", "A"}, {"A", "C", "B
- FaNm1 = {"Face2", "Face3", "Face4", "Face1"}
- FaProj1 = {0.65, 1.44, 2.89, 0.8}
- Face1 = {"D", "B", "C"}
- Face2 = {"D", "C", "A"}
- Face3 = {"D", "B", "A"}
- Face4 = {"A", "C", "B"}
- Fadj1 = {{{2, 1}, {3, 3}, {4, 4}}, {{1, 1}, {3, 2}, {4, 4},
- InternPt1 = {{{(0.27, -2.03, 0), (-0.25, -1.69, 0), (1.08,
- InternPtNb1 = {2}
- InternRec1 = {{1.55, 0.86, 1.29}}
- MinSeg1 = {{{(1, 2), {2, 3}}, {{1, 3}, {3, 1}}, {{1, 4}, {1
- MinSegFa1 = {{{(1, 3), {1, 3}}, {{1, 4}, {3, 4}}, {{1, 2},
- OneFacePt1 = {{{(-1.82, 1.15, 0), (-1.78, 0.26, 0), (1.0
- OneFaceRec1 = {2.54, 1.63, 2.03}
- PF1 = $\begin{pmatrix} 1 & 2 & 3 & ? \\ ? & 2 & 3 & 4 \\ 1 & ? & 3 & 4 \\ 1 & 2 & ? & 4 \end{pmatrix}$
- $\begin{pmatrix} 1 & 2 & 3 \\ ? & ? & 4 \end{pmatrix}$

Graphics

Graphics 2

Scale1 = 0.15

ExternalFace1 = 1

3D Graphics

You can shift the polyhedron closer to the 0Z axis for better clarity

Input

Minkowski Sum blank.ggb

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Algebra Graphics Graphics 2 3D Graphics

Boolean Value
 AvComp = true

List

- AvInst = {"SetPointSize(OneFacePt1,1)", "SetColor
- AvInst2 = {"Repeat(NbFa1,Execute(AvInst))" }
- FP1 =
$$\begin{pmatrix} 1 & ? & 3 & 4 \\ 1 & 2 & ? & 4 \\ 1 & 2 & 3 & ? \\ ? & 2 & 3 & 4 \end{pmatrix}$$
- FPcir1 = {{{2, 1}, {3, 3}, {4, 4}, {2, 1}}, {{1, 1}, {3, 2},
- FPsort1 =
$$\begin{pmatrix} 4 & 3 & 1 \\ 4 & 2 & 1 \\ 1 & 3 & 2 \\ 4 & 2 & 3 \end{pmatrix}$$
- Fa1 = {"D", "C", "A"}, {"D", "B", "A"}, {"A", "C", "B
- FaNm1 = {"Face2", "Face3", "Face4", "Face1"}
- FaProj1 = {0.65, 1.44, 2.89, 0.8}
- Face1 = {"D", "B", "C"}
- Face2 = {"D", "C", "A"}
- Face3 = {"D", "B", "A"}
- Face4 = {"A", "C", "B"}
- Fadj1 = {{{2, 1}, {3, 3}, {4, 4}}, {{1, 1}, {3, 2}, {4, 4}},
- InternPt1 = {{{(0.51, -0.45, 0), (-0.29, -0.33, 0), (-0.53
- InternPtNb1 = {4}
- InternRec1 = {{1.29, 2.03, 1.63}}
- MinSeg1 = {{{(1, 2), {2, 3}}, {{1, 3}, {3, 1}}, {{1, 4}, {1
- MinSegFa1 = {{{(1, 3), {1, 3}}, {{1, 4}, {3, 4}}, {{1, 2},
- OneFacePt1 = {{{(-0.25, -1.69, 0), (0.27, -2.03, 0), (1.6
- OneFaceRec1 = {1.55, 2.54, 0.86}
- PF1 =
$$\begin{pmatrix} 1 & 2 & 3 & ? \\ ? & 2 & 3 & 4 \\ 1 & ? & 3 & 4 \\ 1 & 2 & ? & 4 \end{pmatrix}$$
- $$\begin{pmatrix} 1 & 2 & 3 \\ ? & ? & 4 \end{pmatrix}$$

Scale1 = 0.15

ExternalFace1 = 3

Number ExternalFace1

A_{xy} B_{xy} C_{xy} D_{xy} A_z B_z C_z D_z

A B C D

A B C D

You can select which face is the "external face" (to visualise forces in compression and tension,³ etc.)

Input