```
Exit[]

Needs["VectorAnalysis`"]; Needs["ComputationalGeometry`"];

Winkel[a_, b_, c_] := ArcCos[(a ^ 2 - b ^ 2 - c ^ 2) / (-2 b c)]
```

```
B = {};
α = 0;
A = {{0, 0.06}, {0.9, 0.09}, {1.1, 0.43}, {1.5, 0.41}, {2, 0.21}, {3.19, 0.125}};
B = {Cos[α] #[[1]], Sin[α] #[[1]], -#[[2]]} & /@ A;
α = Winkel[1.51, 5.07, 4.78]; α / π * 180
A = {{0.45, 0.105}, {0.46, .42}, {1.6, .47}, {2.3, 0.39}, {3.12, .26}, {4.66, 0.27}};
B = Join[B, {Cos[α] #[[1]], Sin[α] #[[1]], -#[[2]]} & /@ A];
α = Winkel[2.44, 5.06, 4.78]; α / π * 180
A = {{.28, 0.1}, {.3, .44}, {1.75, .53},
   {2.39, .64}, {2.8, .47}, {3.3, .34}, {4, .32}, {4.8, .3}};
B = Join[B, {Cos[α] #[[1]], Sin[α] #[[1]], -#[[2]]} & /@ A];
α = Winkel[1.53, 2, 2]; α / π * 180
A = {{.22, .12}, {.3, .47}, {1.35, .52}, {2.0, .74}, {2.58, .6},
   {3.07, .76}, {3.53, .8}, {3.83, .72}, {4, .41}, {4.6, .3}, {5.06, .24}};
B = Join[B, {Cos[α] #[[1]], Sin[α] #[[1]], -#[[2]]} & /@ A];
α = Winkel[1.9, 2, 2]; α / π * 180
A = {{.22, .12}, {.27, .47}, {.9, .51}, {1.75, .63},
   {2.22, .49}, {2.66, .7}, {3.4, .83}, {4.16, .8}, {4.26, .39}, {5.1, .21}};
B = Join[B, {Cos[α] #[[1]], Sin[α] #[[1]], -#[[2]]} & /@ A];
α = Winkel[1.22, 1, 1]; α / π * 180
A = {{.2, .11}, {.285, .47}, {1.4, .53}, {2, .52}, {2.9, .66},
   {3.56, .73}, {4, .57}, {4.25, .25}, {4.46, .18}, {5.09, .23}};
B = Join[B, {Cos[α] #[[1]], Sin[α] #[[1]], -#[[2]]} & /@ A];
α = Winkel[1.42, 1, 1]; α / π * 180
A = {{.18, .12}, {.2, .45}, {1, .52},
   {2, .52}, {3, .55}, {3.46, .62}, {4, .32}, {5.14, .28}};
B = Join[B, {Cos[α] #[[1]], Sin[α] #[[1]], -#[[2]]} & /@ A];
α = π - Winkel[1.10, 1, 1]; α / π * 180
A = {{.18, .12}, {.2, .47}, {1, .505}, {2, .44}, {3, .525}, {3.48, .34}, {4, .26}};
B = Join[B, {Cos[α] #[[1]], Sin[α] #[[1]], -#[[2]]} & /@ A];
α = π - Winkel[.885, 1, 1]; α / π * 180
A = {{.18, .11}, {.2, .46}, {1, .46}, {2, .455}, {3, .44}, {3.6, .43}, {4, .15}};
B = Join[B, {Cos[α] #[[1]], Sin[α] #[[1]], -#[[2]]} & /@ A];
α = π - Winkel[1.31, 2, 2]; α / π * 180
A = {{.22, .1}, {.25, .45}, {1, .47}, {2, .42}, {3, .45}, {3.34, .45}, {3.47, .2}, {4, .2}};
B = Join[B, {Cos[α] #[[1]], Sin[α] #[[1]], -#[[2]]} & /@ A];
α = π - Winkel[.83, 2, 2]; α / π * 180
A = {{.3, .08}, {.32, .44}, {1, .4}, {2, .38}, {3, .4}, {3.13, .13}, {4, .11}};
B = Join[B, {Cos[α] #[[1]], Sin[α] #[[1]], -#[[2]]} & /@ A];
α = π - Winkel[.295, 2, 2]; α / π * 180
A = {{.49, .1}, {.52, .4}, {1, .4}, {2, .39}, {2.5, .26}, {3, .29}, {3.1, .17}, {4, .15}};
B = Join[B, {Cos[α] #[[1]], Sin[α] #[[1]], -#[[2]]} & /@ A];
α = π; α / π * 180
A = {{.55, .09}, {.7, .39}, {1.5, .39},
   {2, .39}, {2.1, .27}, {2.9, .29}, {3.1, .13}, {3.6, .15}};
B = Join[B, {Cos[α] #[[1]], Sin[α] #[[1]], -#[[2]]} & /@ A];
c = {{#[[1]], #[[2]]}, #[[3]]} & /@ B;
```

```
17.3131
```

28.5326

44.9772

56.7187

75.179

90.4698

113.266

127.473

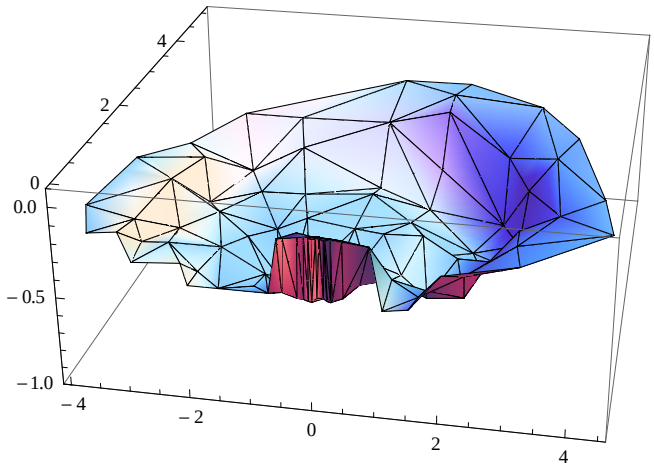
141.766

156.048

171.541

180

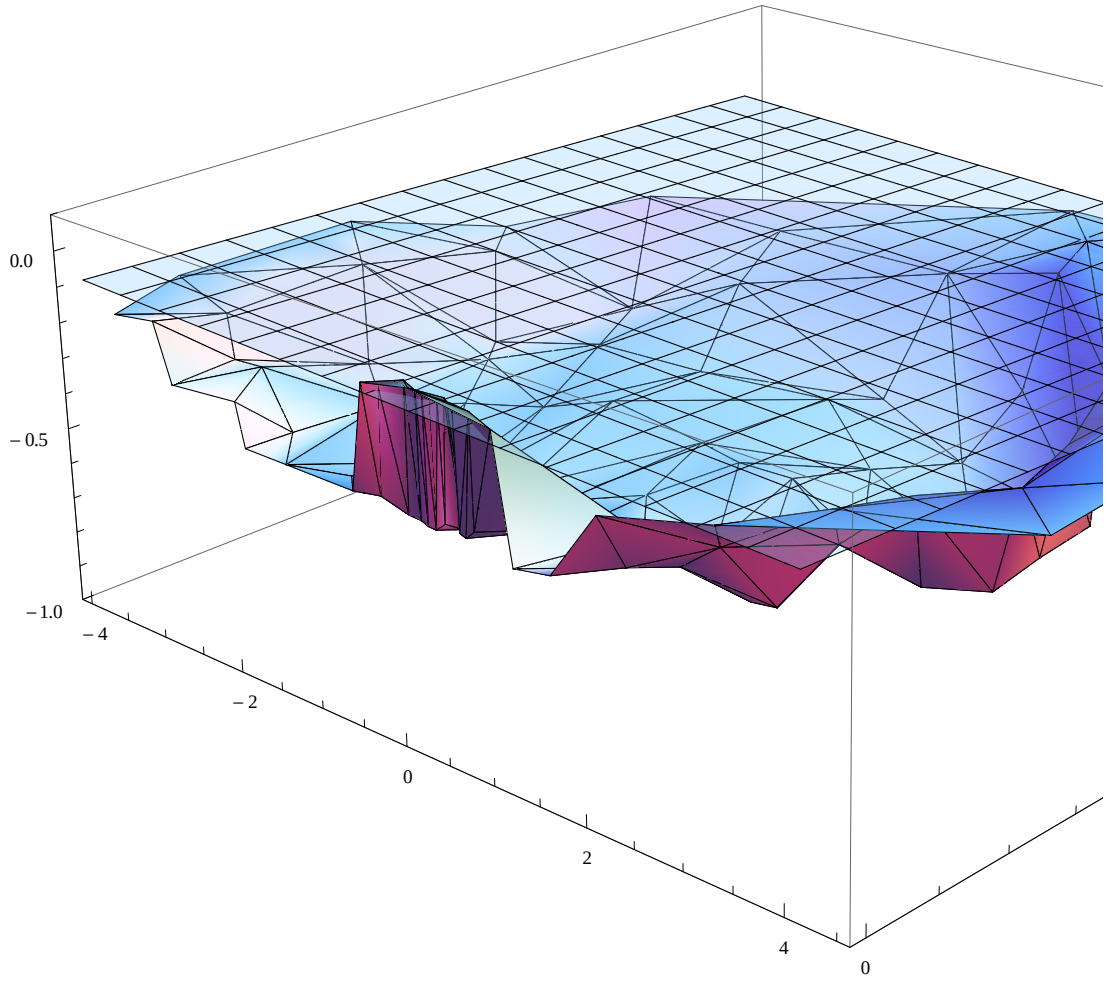
```
plot1 = ListPlot3D[B, Mesh → All, PlotRange → {0.1, -1}]
```



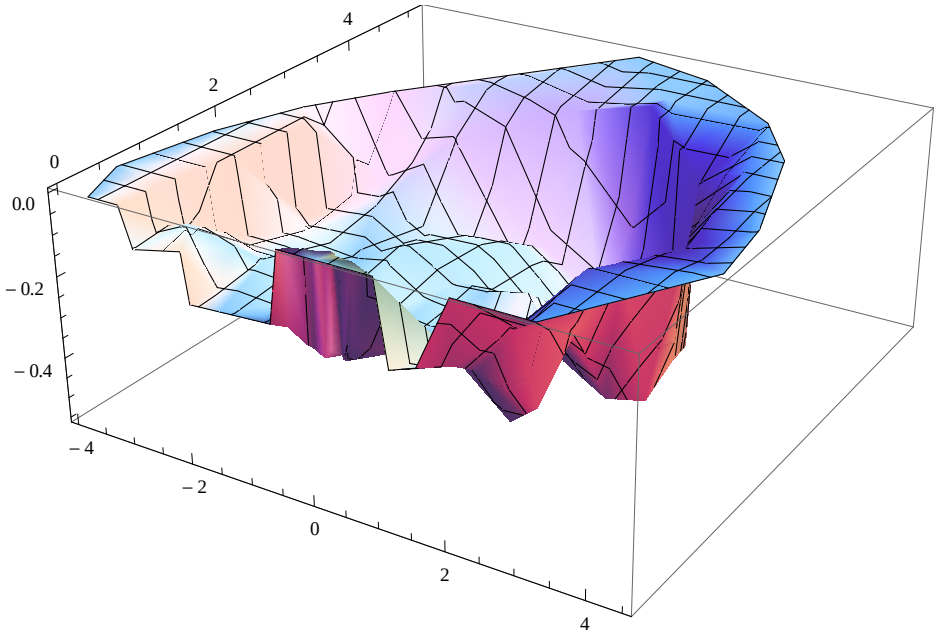

```
ll = Append[Sort[B, #1[[2]] > #2[[2]] &][[ ;; 2]], B[[1]]]
```

{{−0.042148, 5.13983, −0.28}, {1.30202, 4.92065, −0.23}, {0, 0, −0.06}}

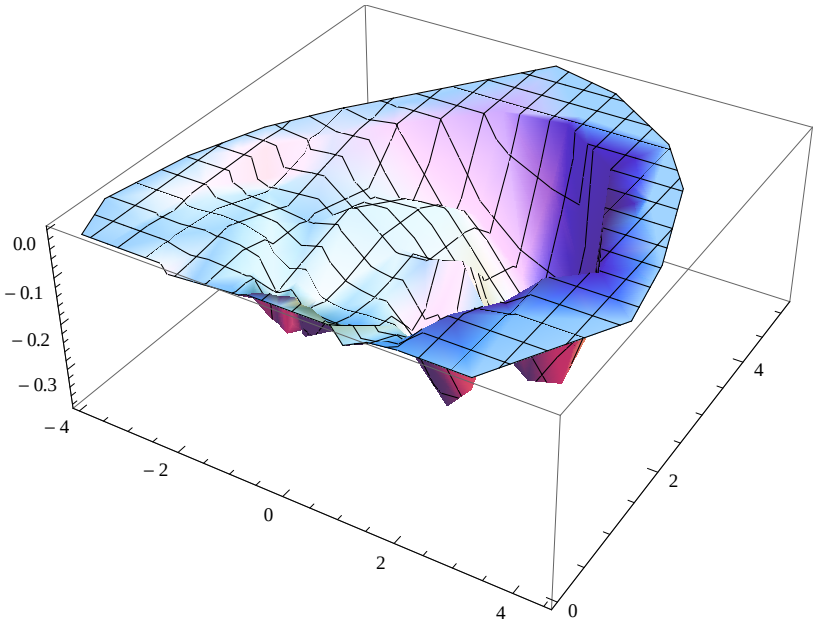
```
ll = {{-2, 5.2, -0.18}, {4, 5, -0.23}, {0, 0, -0.12}};
pl[x_, y_] :=
 Solve[CrossProduct[ll[[2]] - ll[[1]], ll[[3]] - ll[[1]]].({x, y, z} - ll[[1]]) == 0, z][[
  1, 1, 2]]
Show[plot1, Plot3D[pl[x, y], {x, -4, 4}, {y, 0, 5},
  PlotRange → {.1, -1}, PlotStyle → Opacity[0.3]]]
```



```
B2 = {#[[1]], #[[2]], Min[0, 0.1 + #[[3]] - pl[#[[1]], #[[2]]]]} & /@ B;
ListPlot3D[B2]
```

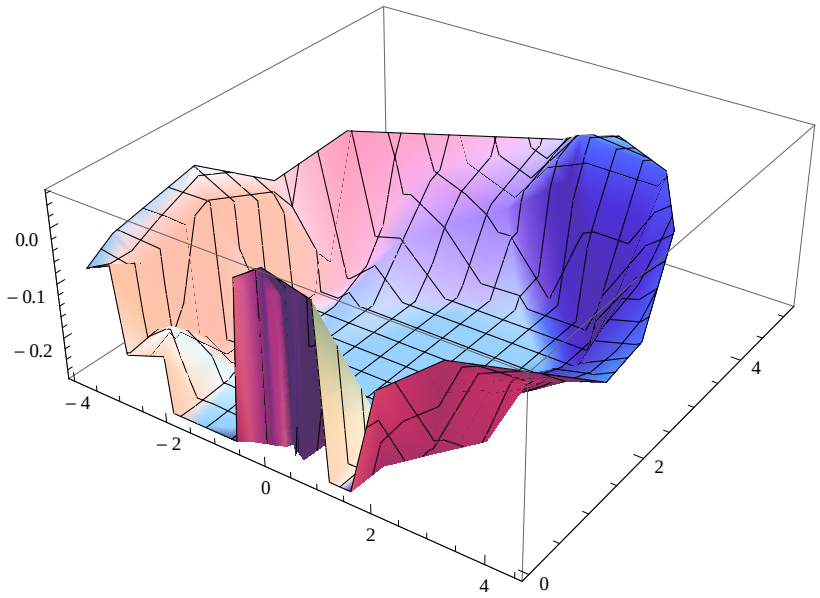



```
Erde = .27;

(* Kies *)

Bkies = {#[[1]], #[[2]], Min[0, Erde + #[[3]] - pl[#[[1]], #[[2]]]]} & /@ B;
ListPlot3D[Bkies]
Dreiecke[Bkies]
```




```
2.20245

(* Erde *)
```

```
Berde = {#[[1]], #[[2]], Max[-Erde, #[[3]] - pl[#[[1]], #[[2]]]]} & /@ B;
ListPlot3D[Berde]
Dreiecke[Berde]
```




```
6.09438
```

```
Needs["VectorAnalysis`"];
```

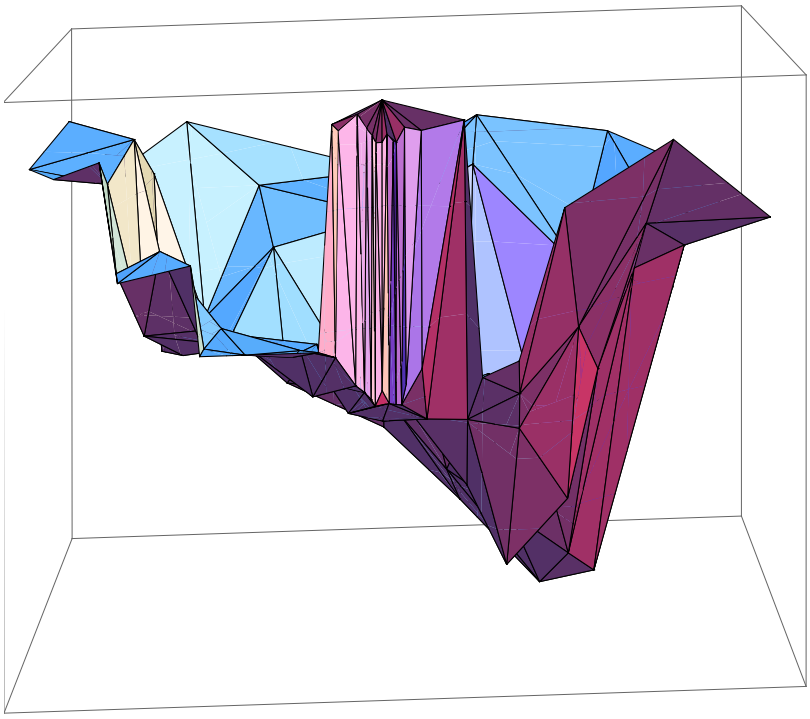
```
JLink`JavaObject::bad :
  The method or field named createMessageURI was called on an invalid Java object. >>

CrossProduct::shdw :
  Symbol CrossProduct appears in multiple contexts {VectorAnalysis`, Global`}; definitions
    in context VectorAnalysis` may shadow or be shadowed by other definitions.
```

```
Volumen[liste_] := Module[{bS, cS, a, b, c},
  Needs["VectorAnalysis`"];
  {a, b, c} = Sort[liste, Abs[#1[[3]]] < Abs[#2[[3]]] &];
  bS = {b[[1]], b[[2]], a[[3]]};
  cS = {c[[1]], c[[2]], a[[3]]};
  1/6 (Abs[CrossProduct[b - a, c - a].(bS - a)] + Abs[CrossProduct[bS - a, cS - a].(c - a)]) +
   Abs[a[[3]]]/2 Norm[CrossProduct[cS - a, bS - a]]
]
```

```
Dreiecke[co_] := Module[{a, b, c, f, ee, i, j},
  Needs["ComputationalGeometry`"];
  c = {#[[1]], #[[2]]} & /@ co;
  (*Print[ListPlot[c]];
  Print["Fläche: ",ConvexHullArea[c]];*)
  ee = {};
  f = DelaunayTriangulation[c];
  For[i = 1, i ≤ Length[c], i++,
   {a, b} = f[[i]];
   For[j = 1, j < Length[b], j++,
    AppendTo[ee, {a, b[[j]], b[[j + 1]]}];
   ];
  ];
  ee = (co[[#]] &) /@ DeleteDuplicates[Sort /@ ee];
  (*Print[RandomSample[ee,1][[1]]];
  Print[Graphics3D[Polygon[#]&/@ee]];*)
  Total[Volumen /@ ee]
 ]

Dreiecke[B]
```

```
Fläche: 31.343
```

```
{{2.33768, 3.5613, -0.39}, {1.08715, 4.1086, -0.25}, {1.14087, 4.31161, -0.18}}
```



```
Volumen: 12.9895
```