Computational Companion to “Flexible 3×3 Nets of Equimodular Elliptic Type” — Example 3

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Tested on: Mathematica 14.0

In[1]:=
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(*=========================================================================
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=====*)
(*Quit*)
(*All angle sets in degrees*)
anglesDeg = {
   {91.32487959870187, 27.53122212644406,
    103.21844931187813, 120}, (*Vertex 1*)
   {115.75047063536742,
    29.335366103921295, 109.7807695499394, 80}, (*Vertex 2*)
   {31.19200181228523,
    113.66642350596918, 89.61760260813426, 85}, (*Vertex 3*)
   {28.19551791700786, 107.67391515450669,
    121.75654544610931, 75} (*Vertex 4*)};


(*------------------------------------------*)
(*Function to compute sigma from 4 angles*)
computeSigma[{α_, β_, γ_, δ_}] := (α + β + γ + δ) / 2;

(*------------------------------------------*)
(*Function to compute a,b,c,d from angles*)
computeABCD[{α_, β_, γ_, δ_}] :=
  Module[{alpha = α Degree, beta = β Degree, gamma = γ Degree,
    delta = δ Degree, sigma}, sigma = computeSigma[{α, β, γ, δ} Degree];
   {Sin[alpha] / Sin[sigma - alpha], Sin[beta] / Sin[sigma - beta],
    Sin[gamma] / Sin[sigma - gamma], Sin[delta] / Sin[sigma - delta]}];

(*------------------------------------------*)
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```
(*Compute all σ values*)
sigmas = computeSigma /@ anglesDeg;

(*Compute all {a,b,c,d} values*)
results = computeABCD /@ anglesDeg;

(*Optional:extract individual values*)
{a1, b1, c1, d1} = results⟦1⟧;
{a2, b2, c2, d2} = results⟦2⟧;
{a3, b3, c3, d3} = results⟦3⟧;
{a4, b4, c4, d4} = results⟦4⟧;
{σ1, σ2, σ3, σ4} = FullSimplify[sigmas];


(*=============================================================================
 =====*)
(*================================
   CONDITION (N.0)==================================*)
(*=============================================================================
 =====*)
(*uniqueCombos={{1,1,1,1},{1,1,1,-1},{1,1,-1,-1},
  {1,1,-1,1},{1,-1,1,1},{1,-1,-1,1},{1,-1,1,-1},{1,-1,-1,-1}};

checkConditionN0Degrees[{α_,β_,γ_,δ_}]:=Module[
  {angles={α,β,γ,δ},results},results=Mod[uniqueCombos.angles,360]//Chop;
  !MemberQ[results,0]];

conditionsN0=checkConditionN0Degrees/@anglesDeg;
allVerticesPass=And@@conditionsN0;

Column[{TextCell[Style["================= CONDITION (N.0) =================",
    Darker[Green],Bold, 16],"Text"],
  If[allVerticesPass,
   Style["✓ All vertices satisfy (N.0).",Darker[Green],Bold],
   Style["✘ Some vertices fail (N.0).",Red,Bold]]}]*)
uniqueCombos = {{1, 1, 1, 1}, {1, 1, 1, -1}, {1, 1, -1, -1}, {1, 1, -1, 1},
   {1, -1, 1, 1}, {1, -1, -1, 1}, {1, -1, 1, -1}, {1, -1, -1, -1}};

checkConditionN0Degrees[{α_, β_, γ_, δ_}] :=
  Module[{angles = {α, β, γ, δ}, results},
   results = Mod[uniqueCombos.angles, 360] // Chop;
   results];

(*apply to all vertices*)
resultsPerVertex = checkConditionN0Degrees /@ anglesDeg;

(*check pass/fail*)
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```
conditionsN0 = Map[! MemberQ[#, 0] &, resultsPerVertex];
allVerticesPass = And @@ conditionsN0;

Column[{TextCell[Style["================= CONDITION (N.0) =================",
    Darker[Green], Bold, 16], "Text"], (*summary line*)If[allVerticesPass,
   Style["✔ All vertices satisfy (N.0).", Darker[Green], Bold],
   Style["✘ Some vertices fail (N.0).", Red, Bold]],
  (*detailed results for each vertex*)
  Grid[Prepend[Table[{"Vertex " <> ToString[i], resultsPerVertex⟦i⟧,
      If[conditionsN0⟦i⟧, "✔ Pass", "✘ Fail"]}, {i, Length[anglesDeg]}],
    {"Vertex", "Combinations (mod 360)", "Status"}], Frame → All]}]


(*==========================================================================
 =====*)
(*================================
   CONDITION (N.3)================================*)
(*==========================================================================
 =====*)
Ms = FullSimplify[Times @@@ results];
allEqualQ = Simplify[Equal @@ Ms];

Column[{TextCell[Style["================= CONDITION (N.3) =================",
    Darker[Blue], Bold, 16], "Text"], If[allEqualQ,
   Row[{Style["✔ M1 = M2 = M3 = M4 = ", Bold], Ms⟦1⟧}],
   Style["✘ M_i are not all equal.", Red, Bold]]}]


(*==========================================================================
 =====*)
(*==========================CONDITION (N.4)==========================*)
(*==========================================================================
 =====*)
aList = results⟦All, 1⟧;
cList = results⟦All, 3⟧;
dList = results⟦All, 4⟧;

rList = FullSimplify /@ (aList * dList); {r1, r2, r3, r4} = rList;
sList = FullSimplify /@ (cList * dList); {s1, s2, s3, s4} = sList;

Column[{TextCell[Style["================= CONDITION (N.4) =================",
    Darker[Purple], Bold, 16], "Text"],
  If[r1 == r2 && r3 == r4 && s1 == s4 && s2 == s3, Column[
    {Row[{Style["✔ r1 = r2 = ", Bold], r1, Style["; ✔ r3 = r4 = ", Bold], r3}],
     Row[{Style["✔ s1 = s4 = ", Bold], s1, Style["; ✔ s2 = s3 = ", Bold],
       s2}]}], Style["✘ Condition (N.4) fails.", Red, Bold]]
 }]
```

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(*==============================================================================
 =====*)
(*==================================
  CONDITION (N.5)================================*)
(*==============================================================================
 =====*)
fList = FullSimplify /@ (aList * cList); {f1, f2, f3, f4} = fList;
M1 = Ms[[1]];

m[M1_] := Piecewise[{{1 - M1, M1 < 1}, {(M1 - 1) / M1, M1 > 1}}] // N;
K = EllipticK[m[M1]] // N;
Kp = EllipticK[1 - m[M1]] // N;

computeTi[i_] :=
  Module[{sigma = sigmas[[i]], r = rList[[i]], s = sList[[i]], f = fList[[i]], base},
   base = I * Im[InverseJacobiDN[Piecewise[
         {{Sqrt[f], M1 < 1}, {1 / Sqrt[f], M1 > 1}}], m[M1]]] / Kp;
   Which[sigma < 180, Which[r > 1 && s > 1, base, (r < 1 && s > 1) || (r > 1 && s < 1),
     1 + base, r < 1 && s < 1, 2 + base], sigma > 180, Which[r > 1 && s > 1,
     2 + base, (r < 1 && s > 1) || (r > 1 && s < 1), 3 + base, r < 1 && s < 1, base]]];

tList = computeTi /@ Range[4];
RoundWithTolerance[x_, tol_ : 10^(-15)] :=
  Module[{nearest}, nearest = Round[x];
   If[Abs[x - nearest] ≤ tol, nearest, x]];

checkValidCombination[M1_, ε_ : 10^(-15)] :=
  Module[{i, combo, dotProd, rePart, imPart, n2, expr, foundQ = False},
   Print[Style["⚠ Approximate validation using ε-tolerance. For rigorous
       proof, see the referenced paper.", Darker@Orange, Italic]];
   Do[combo = uniqueCombos[[i]];
    dotProd = tList.combo;
    rePart = Abs[Re[dotProd]];
    imPart = Abs[Im[dotProd]];
    If[M1 < 1,
     If[Mod[RoundWithTolerance[rePart], 4] < ε,
      If[Mod[RoundWithTolerance[imPart], 2] < ε, expr =
        tList[[1]] + combo[[2]] × tList[[2]] + combo[[3]] × tList[[3]] + combo[[4]] × tList[[4]];
       Print[Style["✅ Valid Combination Found (M < 1):",
          Darker[Green], Bold], "\n", Style["e1 = ", Bold], combo[[2]],
        Style[", e2 = ", Bold], combo[[3]], Style[", e3 = ", Bold], combo[[4]],
        "\n", Style["t1 = ", Bold], Re[tList[[1]]], "K + ", Im[tList[[1]]], "iK'",
        "\n", Style["t2 = ", Bold], Re[tList[[2]]], "K + ", Im[tList[[2]]], "iK'",
        "\n", Style["t3 = ", Bold], Re[tList[[3]]], "K + ", Im[tList[[3]]], "iK'",
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          "\n", Style["t4 = ", Bold], Re[tList⟦4⟧], "K + ", Im[tList⟦4⟧],
          "iK'", "\n", Style["t1 + e1*t2 + e2*t3 + e3*t4 = ", Bold],
          Re[expr], "K + ", Im[expr], "iK'"];
         foundQ = True;
         Break[]]]];
      If[M1 > 1,
       If[Mod[RoundWithTolerance[imPart], 2] < ε,
        n2 = Quotient[RoundWithTolerance[imPart], 2];
        If[Mod[RoundWithTolerance[Abs[rePart - 2 n2]], 4] < ε, expr =
          tList⟦1⟧ + combo⟦2⟧ × tList⟦2⟧ + combo⟦3⟧ × tList⟦3⟧ + combo⟦4⟧ × tList⟦4⟧;
         Print[Style["✅ Valid Combination Found (M > 1):",
           Darker[Green], Bold], "\n", Style["e1 = ", Bold], combo⟦2⟧,
          Style[", e2 = ", Bold], combo⟦3⟧, Style[", e3 = ", Bold], combo⟦4⟧,
          "\n", Style["t1 = ", Bold], Re[tList⟦1⟧], "K + ", Im[tList⟦1⟧], "iK'",
          "\n", Style["t2 = ", Bold], Re[tList⟦2⟧], "K + ", Im[tList⟦2⟧], "iK'",
          "\n", Style["t3 = ", Bold], Re[tList⟦3⟧], "K + ", Im[tList⟦3⟧], "iK'",
          "\n", Style["t4 = ", Bold], Re[tList⟦4⟧], "K + ", Im[tList⟦4⟧],
          "iK'", "\n", Style["t1 + e1*t2 + e2*t3 + e3*t4 = ", Bold],
          Re[expr], "K + ", Im[expr], "iK'"];
         foundQ = True;
         Break[]]]], {i, Length[uniqueCombos]}];
     If[! foundQ, Print[Style["❌ No valid combination found.", Red, Bold], "\n",
       Style["t1 = ", Bold], Re[tList⟦1⟧], "K + ", Im[tList⟦1⟧], "iK'", "\n",
       Style["t2 = ", Bold], Re[tList⟦2⟧], "K + ", Im[tList⟦2⟧], "iK'", "\n",
       Style["t3 = ", Bold], Re[tList⟦3⟧], "K + ", Im[tList⟦3⟧], "iK'", "\n",
       Style["t4 = ", Bold], Re[tList⟦4⟧], "K + ", Im[tList⟦4⟧], "iK'", "\n"]];];


Column[{TextCell[Style["================= CONDITION (N.5) =================",
     Darker[Red], Bold, 16], "Text"]}]
res = checkValidCombination[M1];


(*============================================================================
 =====*)
(*================================
   OTHER PARAMETER==================================*)
(*============================================================================
 =====*)
cosSigmaAlt[Mi_, fi_, ri_, si_] :=
  (Mi (fi + ri + si - 1) + ri fi si - ri fi - ri si - fi si) / (2 Sqrt[ri si fi] (1 - Mi));

Column[
 {TextCell[Style["================= OTHER PARAMETERS =================",
     Darker[Orange], Bold, 16], "Text"],
  Row[{Style["u = ", Bold], 1 - M1}],
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  Row[{Style["σ1 = ", Bold], σ1 Degree, Style[", σ2 = ", Bold], σ2 Degree,
    Style[", σ3 = ", Bold], σ3 Degree, Style[", σ4 = ", Bold], σ4 Degree}],
  Row[{Style["σ1 ≈ ", Bold], N[σ1], Style["°", Bold], Style[", σ2 ≈ ", Bold],
    N[σ2], Style["°", Bold], Style[", σ3 ≈ ", Bold], N[σ3],
    Style["°", Bold], Style[", σ4 ≈ ", Bold], N[σ4], Style["°", Bold]}],
  Row[{Style["cosσ1 = ", Bold], Simplify@cosSigmaAlt[M1, f1, r1, s1],
    Style[", cosσ2 = ", Bold], Simplify@cosSigmaAlt[M1, f2, r2, s2],
    Style[", cosσ3 = ", Bold], Simplify@cosSigmaAlt[M1, f3, r3, s3],
    Style[", cosσ4 = ", Bold], Simplify@cosSigmaAlt[M1, f4, r4, s4]}],
  Row[{Style["f1 = ", Bold], f1, Style[", f2 = ", Bold],
    f2, Style[", f3 = ", Bold], f3, Style[", f4 = ", Bold], f4}],
  Row[{Style["z1 = ", Bold], FullSimplify[1 / (f1 - 1)], Style[", z2 = ", Bold],
    FullSimplify[1 / (f2 - 1)], Style[", z3 = ", Bold], FullSimplify[1 / (f3 - 1)],
    Style[", z4 = ", Bold], FullSimplify[1 / (f4 - 1)]}],
  Row[{Style["x1 = ", Bold], FullSimplify[1 / (r1 - 1)], Style[", x2 = ", Bold],
    FullSimplify[1 / (r2 - 1)], Style[", x3 = ", Bold], FullSimplify[1 / (r3 - 1)],
    Style[", x4 = ", Bold], FullSimplify[1 / (r4 - 1)]}],
  Row[{Style["y1 = ", Bold], FullSimplify[1 / (s1 - 1)], Style[", y2 = ", Bold],
    FullSimplify[1 / (s2 - 1)], Style[", y3 = ", Bold], FullSimplify[1 / (s3 - 1)],
    Style[", y4 = ", Bold], FullSimplify[1 / (s4 - 1)]}],
  Row[{Style["p1 = ", Bold], Simplify[Sqrt[r1 - 1]],
    Style[", p2 = ", Bold], Simplify[Sqrt[r2 - 1]], Style[", p3 = ", Bold],
    Simplify[Sqrt[r3 - 1]], Style[", p4 = ", Bold], Simplify[Sqrt[r4 - 1]]}],
  Row[{Style["q1 = ", Bold], Simplify[Sqrt[s1 - 1]],
    Style[", q2 = ", Bold], Simplify[Sqrt[s2 - 1]], Style[", q3 = ", Bold],
    Simplify[Sqrt[s3 - 1]], Style[", q4 = ", Bold], Simplify[Sqrt[s4 - 1]]}],
  Row[{Style["p1·q1 = ", Bold], Simplify[Sqrt[r1 - 1] Sqrt[s1 - 1]],
    Style[", p2·q2 = ", Bold], Simplify[Sqrt[r2 - 1] Sqrt[s2 - 1]],
    Style[", p3·q3 = ", Bold], Simplify[Sqrt[r3 - 1] Sqrt[s3 - 1]],
    Style[", p4·q4 = ", Bold], Simplify[Sqrt[r4 - 1] Sqrt[s4 - 1]]}]
 }]


(*==========================================================================================
 =====*)
(*===================================
  BRICARD's EQUATIONS===================================*)
(*==========================================================================================
 =====*)
(*==========================================
 FLEXION 1==========================================*)
Z[t_] := t;
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$$W1[t\_] := \left(2.2689737907253456`\,\left(10.50393110877767`\,t - 2.542115267025096`\,\sqrt{\left(1 - 0.5721009760467486`\,t^2\right)\left(-1 + 7.594436687028424`\,t^2\right)}\right)\right) \Big/ \left(14.662902846473798` + 7.594436687028424`\,t^2\right);$$

```
U[t_] := (0.20405148639750417` (1.1778865025892307` t + 10.102197432038`
        √((1 - 0.5721009760467486` t²) (-1 + 7.594436687028424` t²)))) /
   (3.6622434357916323` - 2.099237700754583` t²);
W2[t_] := (1.3011995890502461` (5.832687748284718` t - 1.6606733509905591`
        √((1 - 0.5721009760467486` t²) (-1 + 7.594436687028424` t²)))) /
   (3.588495042139688` + 7.594436687028424` t²);


(*General polynomial constructor*)
BricardsEquation[{α_, β_, γ_, δ_}, σ_, x_, y_] :=
  Module[{c22, c20, c02, c11, c00},
   c22 = Sin[σ - δ] Sin[σ - δ - β];
   c20 = Sin[σ - α] Sin[σ - α - β];
   c02 = Sin[σ - γ] Sin[σ - γ - β];
   c11 = -Sin[α] Sin[γ];
   c00 = Sin[σ] Sin[σ - β];
   c22 x^2 y^2 + c20 x^2 + c02 y^2 + 2 c11 x y + c00];

(*Compute and print all P_i for flexion 1*)
TextCell[
 Style["================ FLEXIBILITY (FLEXION 1) ================",
  Darker[Cyan], Bold, 16], "Text"]
funcs = {{Z, W1}, {Z, W2}, {U, W2}, {U, W1}};
Do[angles = anglesDeg[[i]] Degree;
  sigma = sigmas[[i]] Degree;
  {α, β, γ, δ} = angles;
  poly = Which[i == 1, BricardsEquation[{α, β, γ, δ}, sigma, Z[t], W1[t]],
    i == 2, BricardsEquation[{α, β, γ, δ}, sigma, Z[t], W2[t]],
    i == 3, BricardsEquation[{α, β, γ, δ}, sigma, U[t], W2[t]],
    i == 4, BricardsEquation[{α, β, γ, δ}, sigma, U[t], W1[t]]];
  Print[Row[{Subscript["P", i], "[", funcs[[i, 1]],
     ", ", funcs[[i, 2]], "] = ", FullSimplify[poly]}]], {i, 1, 4}];

(*t-range*)
tMin = 0.4;
tMax = 1.25;

(*Build P_i(t) consistently with your printing logic*)
Clear[PiExpr, labels, funcs];
funcs = {{Z, W1}, {Z, W2}, {U, W2}, {U, W1}};

PiExpr = Table[Module[{angles = anglesDeg[[i]] Degree,
     sigma = sigmas[[i]] Degree, α, β, γ, δ, poly}, {α, β, γ, δ} = angles;
    poly = BricardsEquation[{α, β, γ, δ}, sigma, funcs[[i, 1]][t], funcs[[i, 2]][t]];
```

```
    FullSimplify[poly]], {i, 1, 4}];

labels = Table[Row[{Subscript["P", i], "[",
     ToString@funcs⟦i, 1⟧, ", ", ToString@funcs⟦i, 2⟧, "]"}], {i, 1, 4}];

(*Pretty panel with plots like your style*)
Column[{TextCell[
   Style["================= FLEXIBILITY (FLEXION 1) =================",
    Darker[Cyan], Bold, 16], "Text"], TextCell[
   Style["Polynomials P_i(t) built from Bricard’s equations for flexion 1.",
    GrayLevel[0.3]], "Text"], Spacer[12],
  Panel[GraphicsGrid[Partition[Table[Plot[Evaluate@PiExpr⟦i⟧,
       {t, tMin, tMax}, PlotLabel → Style[labels⟦i⟧, Bold, 14],
       PlotRange → {-10^(-11), 10^(-11)}, AxesLabel → {"t", None},
       ImageSize → 250], {i, Length[PiExpr]}], 2], Spacings → {2, 2}],
   Background → Lighter[Gray, 0.95], FrameMargins → 15]}]



(*=================================
 FLEXION 2=================================*)
Z2[t_] := t;
W12[t_] := (2.2689737907253456` (10.50393110877767` t + 2.542115267025096`
        Sqrt[(1 - 0.5721009760467486` t^2) (-1 + 7.594436687028424` t^2)])) /
   (14.662902846473798` + 7.594436687028424` t^2);
U2[t_] := (0.20405148639750417` (1.1778865025892307` t - 10.102197432038`
        Sqrt[(1 - 0.5721009760467486` t^2) (-1 + 7.594436687028424` t^2)])) /
   (3.6622434357916323` - 2.099237700754583` t^2);
W22[t_] := (1.3011995890502461` (5.832687748284718` t + 1.6606733509905591`
        Sqrt[(1 - 0.5721009760467486` t^2) (-1 + 7.594436687028424` t^2)])) /
   (3.588495042139688` + 7.594436687028424` t^2);

(*General polynomial constructor*)
BricardsEquation[{α_, β_, γ_, δ_}, σ_, x_, y_] :=
  Module[{c22, c20, c02, c11, c00},
   c22 = Sin[σ - δ] Sin[σ - δ - β];
   c20 = Sin[σ - α] Sin[σ - α - β];
   c02 = Sin[σ - γ] Sin[σ - γ - β];
   c11 = -Sin[α] Sin[γ];
   c00 = Sin[σ] Sin[σ - β];
    c22 x^2 y^2 + c20 x^2 + c02 y^2 + 2 c11 x y + c00];

(*Compute and print all P_i for flexion 2*)
TextCell[
```

```
 Style["================= FLEXIBILITY (FLEXION 2) =================",
  Cyan, Bold, 16], "Text"]
funcs = {{Z, W1}, {Z, W2}, {U, W2}, {U, W1}};
Do[angles = anglesDeg⟦i⟧ Degree;
  sigma = sigmas⟦i⟧ Degree;
  {α, β, γ, δ} = angles;
  poly = Which[i == 1, BricardsEquation[{α, β, γ, δ}, sigma, Z2[t], W12[t]],
    i == 2, BricardsEquation[{α, β, γ, δ}, sigma, Z2[t], W22[t]],
    i == 3, BricardsEquation[{α, β, γ, δ}, sigma, U2[t], W22[t]],
    i == 4, BricardsEquation[{α, β, γ, δ}, sigma, U2[t], W12[t]]];
  Print[Row[{Subscript["P", i], "[", funcs⟦i, 1⟧,
     ", ", funcs⟦i, 2⟧, "] = ", FullSimplify[poly]}]], {i, 1, 4}];

(*t-range*)
tMin = 0.4;
tMax = 1.25;

(*Build P_i(t) consistently with your printing logic*)
Clear[PiExpr, labels, funcs];
funcs = {{Z2, W12}, {Z2, W22}, {U2, W22}, {U2, W12}};

PiExpr = Table[Module[{angles = anglesDeg⟦i⟧ Degree,
     sigma = sigmas⟦i⟧ Degree, α, β, γ, δ, poly}, {α, β, γ, δ} = angles;
    poly = BricardsEquation[{α, β, γ, δ}, sigma, funcs⟦i, 1⟧[t], funcs⟦i, 2⟧[t]];
    FullSimplify[poly]], {i, 1, 4}];

labels = Table[Row[{Subscript["P", i], "[",
     ToString@funcs⟦i, 1⟧, ", ", ToString@funcs⟦i, 2⟧, "]"}], {i, 1, 4}];

(*Pretty panel with plots like your style*)
Column[{TextCell[
   Style["================= FLEXIBILITY (FLEXION 2) =================",
    Cyan, Bold, 16], "Text"], TextCell[
   Style["Polynomials P_i(t) built from Bricard's equations for flexion 2.",
    GrayLevel[0.3]], "Text"], Spacer[12],
  Panel[GraphicsGrid[Partition[Table[Plot[Evaluate@PiExpr⟦i⟧,
       {t, tMin, tMax}, PlotLabel → Style[labels⟦i⟧, Bold, 14],
       PlotRange → {-10^(-11), 10^(-11)}, AxesLabel → {"t", None},
       ImageSize → 250], {i, Length[PiExpr]}], 2], Spacings → {2, 2}],
   Background → Lighter[Gray, 0.95], FrameMargins → 15]}]



(*==========================================================================
 =====*)
(*===================================
 NOT TRIVIAL==================================*)
```

```
(*=============================================================================
 =====*)
(*Define domain limits for t*)
tMin = 0.4;
tMax = 1.25;

(*===================================
 FLEXION 1==================================*)
(*List of expressions to plot*)
expressions = {Z[t], W2[t], U[t], W1[t]};
labels = {"Z", "W2", "U", "W1"};

Column[{TextCell[
   Style["================= NOT TRIVIAL (FLEXION 1) =================",
    Darker[Brown], Bold, 16], "Text"],

  (*Explanatory text*)
  TextCell[Style["This configuration does not belong to the trivial class –
      even after switching the boundary strips – since none of the
      functions Z, W2, U, or W1 is constant.", GrayLevel[0.3]], "Text"],
  Spacer[12],

  (*Plots in a light panel*)
  Panel[GraphicsGrid[Partition[Table[Plot[expressions⟦i⟧, {t, tMin, tMax},
       PlotLabel → Style[labels⟦i⟧, Bold, 14], PlotRange → All,
       AxesLabel → {"t", None}, ImageSize → 250], {i, Length[expressions]}], 2],
    Spacings → {2, 2}], Background → Lighter[Gray, 0.95], FrameMargins → 15]

 }]

(*===================================
 FLEXION 2==================================*)
(*List of expressions to plot*)
expressions = {Z2[t], W22[t], U2[t], W12[t]};
labels = {"Z", "W2", "U", "W1"};

Column[{TextCell[
   Style["================= NOT TRIVIAL (FLEXION 2) =================",
    Brown, Bold, 16], "Text"],

  (*Explanatory text*)
  TextCell[Style["This configuration does not belong to the trivial class –
      even after switching the boundary strips – since none of the
      functions Z, W2, U, or W1 is constant.", GrayLevel[0.3]], "Text"],
  Spacer[12],

  (*Plots in a light panel*)
```

```
  Panel[GraphicsGrid[Partition[Table[Plot[expressions⟦i⟧, {t, tMin, tMax},
        PlotLabel → Style[labels⟦i⟧, Bold, 14], PlotRange → All,
        AxesLabel → {"t", None}, ImageSize → 250], {i, Length[expressions]}], 2],
    Spacings → {2, 2}], Background → Lighter[Gray, 0.95], FrameMargins → 15]

 }]


(*=============================================================================
 =====*)
(*===================
 NOT LINEAR COMPOUND & NOT LINEAR CONJUGATE===================*)
(*=============================================================================
 =====*)
(*Define domain limits for t*)
tMin = 0.4;
tMax = 1.25;

(*===================================
 FLEXION 1===================================*)
(*List of expressions& labels*)
expressions =
  {Z[t] * U[t], Z[t] / U[t], W1[t] * W2[t], W1[t] / W2[t], Z[t] * W2[t], Z[t] / W2[t],
   U[t] * W1[t], U[t] / W1[t], Z[t] * W1[t], Z[t] / W1[t], W2[t] * U[t], W2[t] / U[t]};
labels = {"Z * U", "Z / U", "W1 * W2", "W1 / W2", "Z * W2", "Z / W2",
   "U * W1", "U / W1", "Z * W1", "Z / W1", "W2 * U", "W2 / U"};

Column[
 {TextCell[Style["============= NOT LINEAR COMPOUND & NOT LINEAR CONJUGATE
      (FLEXION 1) =============", Darker[Magenta], Bold, 16], "Text"],

  (*Explanatory text*)TextCell[
   Style["This configuration does not belong to the Linear compound class nor
      to the linear conjugate class – even after switching the boundary
      strips – since none of the functions ZU, Z/U, W1W2, W1/W2, ZW2,
      Z/W2, UW1, and U/W1 is constant. In addition, none of ZW1,
      Z/W1, W2U, W2/U is constant as well.", GrayLevel[0.3]], "Text"],
  Spacer[12],

  (*Plots panel*)
  Panel[GraphicsGrid[Partition[Table[Plot[expressions⟦i⟧, {t, tMin, tMax},
        PlotLabel → Style[labels⟦i⟧, Bold, 14], PlotRange → All,
        AxesLabel → {"t", None}, ImageSize → 250], {i, Length[expressions]}], 2],
    Spacings → {2, 2}], Background → Lighter[Gray, 0.95], FrameMargins → 15]
 }]

(*===================================
```

```
 FLEXION 2=================================*)
(*List of expressions& labels*)
expressions = {Z2[t] * U2[t], Z2[t] / U2[t], W12[t] * W22[t], W12[t] / W22[t],
   Z2[t] * W22[t], Z2[t] / W22[t], U2[t] * W12[t], U2[t] / W12[t],
   Z2[t] * W12[t], Z2[t] / W12[t], W22[t] * U2[t], W22[t] / U2[t]};
labels = {"Z * U", "Z / U", "W1 * W2", "W1 / W2", "Z * W2", "Z / W2",
   "U * W1", "U / W1", "Z * W1", "Z / W1", "W2 * U", "W2 / U"};

Column[
 {TextCell[Style["============= NOT LINEAR COMPOUND & NOT LINEAR CONJUGATE
      (FLEXION 2) =============", Magenta, Bold, 16], "Text"],

  (*Explanatory text*)TextCell[
   Style["This configuration does not belong to the Linear compound class nor
      to the linear conjugate class — even after switching the boundary
      strips — since none of the functions ZU, Z/U, W1W2, W1/W2, ZW2,
      Z/W2, UW1, and U/W1 is constant. In addition, none of ZW1,
      Z/W1, W2U, W2/U is constant as well.", GrayLevel[0.3]], "Text"],
  Spacer[12],

  (*Plots panel*)
  Panel[GraphicsGrid[Partition[Table[Plot[expressions⟦i⟧, {t, tMin, tMax},
       PlotLabel → Style[labels⟦i⟧, Bold, 14], PlotRange → All,
       AxesLabel → {"t", None}, ImageSize → 250], {i, Length[expressions]}], 2],
    Spacings → {2, 2}], Background → Lighter[Gray, 0.95], FrameMargins → 15]
 }]


(*==========================================================================
 =====*)
(*===========================
 SWITCHING BOUNDARY STRIPS===========================*)
(*==========================================================================
 =====*)
SwitchingRightBoundaryStrip[anglesDeg_List] := Module[{modified = anglesDeg},
  (*Indices:{row,column}={1,2},{1,3},{4,2},{4,3}*)
  modified⟦1, 2⟧ = 180 - anglesDeg⟦1, 2⟧; (*β1*)
  modified⟦1, 3⟧ = 180 - anglesDeg⟦1, 3⟧; (*γ1*)
  modified⟦4, 2⟧ = 180 - anglesDeg⟦4, 2⟧; (*β4*)
  modified⟦4, 3⟧ = 180 - anglesDeg⟦4, 3⟧; (*γ4*)
  modified]

SwitchingLeftBoundaryStrip[anglesDeg_List] := Module[{modified = anglesDeg},
  (*Indices:{row,column}={2,2},{2,3},{3,2},{3,3}*)
  modified⟦2, 2⟧ = 180 - anglesDeg⟦2, 2⟧; (*β2*)
  modified⟦2, 3⟧ = 180 - anglesDeg⟦2, 3⟧; (*γ2*)
  modified⟦3, 2⟧ = 180 - anglesDeg⟦3, 2⟧; (*β3*)
```

```
  modified[[3, 3]] = 180 - anglesDeg[[3, 3]]; (*γ3*)
  modified]

SwitchingLowerBoundaryStrip[anglesDeg_List] := Module[{modified = anglesDeg},
  (*Indices:{row,column}={1,1},{1,2},{2,1},{2,2}*)
  modified[[1, 1]] = 180 - anglesDeg[[1, 1]]; (*α1*)
  modified[[1, 2]] = 180 - anglesDeg[[1, 2]]; (*β1*)
  modified[[2, 1]] = 180 - anglesDeg[[2, 1]]; (*α2*)
  modified[[2, 2]] = 180 - anglesDeg[[2, 2]]; (*β2*)
  modified]

SwitchingUpperBoundaryStrip[anglesDeg_List] := Module[{modified = anglesDeg},
  (*Indices:{row,column}={3,1},{3,2},{4,1},{4,2}*)
  modified[[3, 1]] = 180 - anglesDeg[[3, 1]]; (*α3*)
  modified[[3, 2]] = 180 - anglesDeg[[3, 2]]; (*β3*)
  modified[[4, 1]] = 180 - anglesDeg[[4, 1]]; (*α4*)
  modified[[4, 2]] = 180 - anglesDeg[[4, 2]]; (*β4*)
  modified]


(*==========================================================================
 =====*)
(*===================================
   NOT CONIC===================================*)
(*==========================================================================
 =====*)
uniqueCombos = {{1, 1, 1, 1}, {1, 1, 1, -1}, {1, 1, -1, -1}, {1, 1, -1, 1},
   {1, -1, 1, 1}, {1, -1, -1, 1}, {1, -1, 1, -1}, {1, -1, -1, -1}};

checkConditionN0Degrees[{α_, β_, γ_, δ_}] :=
  Module[{angles = {α, β, γ, δ}, results},
   results = Mod[uniqueCombos.angles, 360] // Chop;
   ! MemberQ[results, 0]];

conditionsN0 = checkConditionN0Degrees /@ anglesDeg;
allVerticesPass = And @@ conditionsN0;

Column[{TextCell[Style["================= NOT CONIC =================",
    Pink, Bold, 16], "Text"],
  TextCell[Style["Condition (N.0) is satisfied ⇒
      this configuration is NOT equimodular-conic. Applying
      any boundary-strip switch still preserves (N.0), so
      no conic form emerges.", GrayLevel[0.3]], "Text"]
 }]

(*Now the exact same Module for checking all switch combinations…*)
Module[{angles = anglesDeg, switchers, combinations, results},
```

```
 (*Define switch functions*)
 switchers = <|"Right" → SwitchingRightBoundaryStrip,
   "Left" → SwitchingLeftBoundaryStrip, "Lower" → SwitchingLowerBoundaryStrip,
   "Upper" → SwitchingUpperBoundaryStrip|>;
 (*Generate all combinations of switches (from size 1 to 4)*)
 combinations = Subsets[Keys[switchers], {1, Length[switchers]}];
 (*Evaluate condition after each combination of switches*)results = Table[
   Module[{switched = angles, name, passQ}, name = StringRiffle[combo, " + "];
    Do[switched = switchers[sw][switched], {sw, combo}];
    passQ = And @@ (checkConditionN0Degrees /@ switched);
    (*Print the result after switching*)
    (*Print["\nSwitch combination: ",name];
    Print["Switched anglesDeg:"];
    Print[MatrixForm[switched]];*)
    {name, passQ}], {combo, combinations}];
 (*Display results*)
 Column[Prepend[Table[Module[{comboName = res[[1]], passQ = res[[2]]},
     Row[{Style[comboName <> ": ", Bold],
       If[passQ,
        Style["Condition (N.0) is still satisfied.", Darker[Green]],
        Style["Condition (N.0) fails.", Red, Bold]
       ]
      }
     ]], {res, results}], TextCell[
    Style["CONDITION (N.0) AFTER SWITCHING BOUNDARY STRIPS", 14], "Text"]]]]


(*============================================================================
 =====*)
(*==============================
 NOT ORTHODIAGONAL==============================*)
(*============================================================================
 =====*)
Column[
 {TextCell[Style["================= NOT ORTHODIAGONAL =================",
    Purple, Bold, 16], "Text"],
  TextCell[Style[
    "cos(αi)·cos(γi) ≠ cos(βi)·cos(δi) for each i = 1…4 ⇒ NOT orthodiagonal.
      Switching boundary strips does not
      correct this.", GrayLevel[0.3]], "Text"]
 }]

Module[{angles = anglesDeg, switchers, combinations, results},
 (*Define switch functions*)
 switchers = <|"Right" → SwitchingRightBoundaryStrip,
   "Left" → SwitchingLeftBoundaryStrip, "Lower" → SwitchingLowerBoundaryStrip,
   "Upper" → SwitchingUpperBoundaryStrip|>;
```

```
(*Helper function:compute and print difference only*)
formatOrthodiagonalCheck[quad_List] := Module[{vals},
  vals = Table[Module[{a, b, c, d, lhs, rhs, diff}, {a, b, c, d} = quad[[i]];
     lhs = FullSimplify[Cos[a Degree] Cos[c Degree]];
     rhs = FullSimplify[Cos[b Degree] Cos[d Degree]];
     diff = Chop[lhs - rhs];
     Style[Row[{"cos(α" <> ToString[i] <> ")·cos(γ" <> ToString[i] <> ") - ",
        "cos(β" <> ToString[i] <> ")·cos(δ" <> ToString[i] <> ") = ", NumberForm[
         diff, {5, 3}]}], If[diff == 0, Red, Black]]], {i, Length[quad]}];
  Column[vals]];
(*Orthodiagonal check for anglesDeg before any switching*)
Print[TextCell[Style["\nInitial anglesDeg (no switches):", Bold]]];
Print[MatrixForm[angles]];
Print[TextCell[Style[
   "Orthodiagonal check: cos(αi)·cos(γi) - cos(βi)·cos(δi) for i = 1..4",
   Italic]]];
Print[formatOrthodiagonalCheck[angles]];
(*Generate all combinations of switches (from size 1 to 4)*)
combinations = Subsets[Keys[switchers], {1, Length[switchers]}];
(*Evaluate condition after each combination of switches*)results = Table[
  Module[{switched = angles, name, passQ}, name = StringRiffle[combo, " + "];
   Do[switched = switchers[sw][switched], {sw, combo}];
   passQ = And @@ (checkConditionN0Degrees /@ switched);
   Print[Style["\nSwitch combination: ", Bold], name];
   Print[Style["Switched anglesDeg:", Italic]];
   Print[MatrixForm[switched]];
   Print[TextCell[Style[
      "Orthodiagonal check: cos(αi)·cos(γi) - cos(βi)·cos(δi) for i = 1..4",
      Italic]]];
   Print[formatOrthodiagonalCheck[switched]];
   {name, passQ}], {combo, combinations}];]


(*======================================================================
 =====*)
(*==================================
 NOT ISOGONAL==================================*)
(*======================================================================
 =====*)
Column[
 {TextCell[Style["================= NOT ISOGONAL =================", Orange,
    Bold, 15], "Text"],
  TextCell[
   Style["Condition (N.0) holds AND for all i = 1…4: αi ≠ βi, αi ≠ γi, αi
      ≠ δi, βi ≠ γi, βi ≠ δi, γi ≠ δi, αi+βi ≠ π ≠ γi+δi, αi+γi
      ≠ π ≠ βi+δi, αi+δi ≠ π ≠ βi+γi ⇒ NOT isogonal. Switching
      boundary strips do not change this.", GrayLevel[0.3]], "Text"]}]
```

```
Module[{angles = anglesDeg, switchers, combinations, results},
 (*Define switch functions*)
 switchers = <|"Right" → SwitchingRightBoundaryStrip,
   "Left" → SwitchingLeftBoundaryStrip, "Lower" → SwitchingLowerBoundaryStrip,
   "Upper" → SwitchingUpperBoundaryStrip|>;
 (*Helper function:extended angle relations*)
 formatAngleRelations[quad_List] :=
  Module[{vals}, vals = Table[Module[{a, b, c, d, exprs}, {a, b, c, d} = quad[[i]];
      exprs = {Row[{"α" <> ToString[i] <> " - β" <> ToString[i] <> " = ",
          NumberForm[N[a - b], {5, 3}]}], Row[{"α" <> ToString[i] <>
           " - γ" <> ToString[i] <> " = ", NumberForm[N[a - c], {5, 3}]}],
        Row[{"α" <> ToString[i] <> " - δ" <> ToString[i] <> " = ",
          NumberForm[N[a - d], {5, 3}]}], Row[{"β" <> ToString[i] <>
           " - γ" <> ToString[i] <> " = ", NumberForm[N[b - c], {5, 3}]}],
        Row[{"β" <> ToString[i] <> " - δ" <> ToString[i] <> " = ",
          NumberForm[N[b - d], {5, 3}]}], Row[{"γ" <> ToString[i] <>
           " - δ" <> ToString[i] <> " = ", NumberForm[N[c - d], {5, 3}]}],
        Row[{"α" <> ToString[i] <> " + β" <> ToString[i] <> " - 180 = ",
          NumberForm[N[a + b - 180], {5, 3}]}],
        Row[{"γ" <> ToString[i] <> " + δ" <> ToString[i] <> " - 180 = ",
          NumberForm[N[c + d - 180], {5, 3}]}],
        Row[{"α" <> ToString[i] <> " + γ" <> ToString[i] <> " - 180 = ",
          NumberForm[N[a + c - 180], {5, 3}]}],
        Row[{"β" <> ToString[i] <> " + δ" <> ToString[i] <> " - 180 = ",
          NumberForm[N[b + d - 180], {5, 3}]}],
        Row[{"α" <> ToString[i] <> " + δ" <> ToString[i] <> " - 180 = ",
          NumberForm[N[a + d - 180], {5, 3}]}],
        Row[{"β" <> ToString[i] <> " + γ" <> ToString[i] <> " - 180 = ",
          NumberForm[N[b + c - 180], {5, 3}]}],
        Row[{"α" <> ToString[i] <> " + β" <> ToString[i] <> " - γ" <> ToString[i] <>
           " - δ" <> ToString[i] <> " = ", NumberForm[N[a + b - c - d], {5, 3}]}],
        Row[{"α" <> ToString[i] <> " + γ" <> ToString[i] <> " - β" <> ToString[i] <>
           " - δ" <> ToString[i] <> " = ", NumberForm[N[a + c - b - d], {5, 3}]}],
        Row[{"α" <> ToString[i] <> " + δ" <> ToString[i] <> " - β" <> ToString[i] <>
           " - γ" <> ToString[i] <> " = ", NumberForm[N[a + d - b - c], {5, 3}]}]};
      Column[Prepend[exprs, Style["Vertex " <> ToString[i], Bold]]]],
     {i, Length[quad]}];
   Column[vals, Spacings → 1.5]];
 (*Angle relation check for anglesDeg before any switching*)
 Print[TextCell[Style["\nInitial anglesDeg (no switches):", Bold]]];
 Print[MatrixForm[angles]];
 Print[TextCell[Style["Angle relation checks for i = 1..4:", Italic]]];
 Print[formatAngleRelations[angles]];
 (*Generate all combinations of switches (from size 1 to 4)*)
 combinations = Subsets[Keys[switchers], {1, Length[switchers]}];
 (*Evaluate condition after each combination of switches*)results = Table[
```

```
  Module[{switched = angles, name, passQ}, name = StringRiffle[combo, " + "];
   Do[switched = switchers[sw][switched], {sw, combo}];
   passQ = And @@ (checkConditionN0Degrees /@ switched);
   Print[Style["\nSwitch combination: ", Bold], name];
   Print[Style["Switched anglesDeg:", Italic]];
   Print[MatrixForm[switched]];
   Print[TextCell[Style["Angle relation checks for i = 1..4:", Italic]]];
   Print[formatAngleRelations[switched]];
   {name, passQ}], {combo, combinations}];]


(*==========================================================================
 =====*)
(*============================
  NOT CONJUGATE-MODULAR=============================*)
(*==========================================================================
 =====*)
Column[
 {TextCell[Style["================= NOT CONJUGATE-MODULAR =================",
    Brown, Bold, 16], "Text"],
  TextCell[Style["Mi < 1 and pi ∈ ℝ for all i = 1…4 ⇒ NOT conjugate-modular.
      Boundary-strip switches preserve this.", GrayLevel[0.3]], "Text"]
 }]

Module[{angles = anglesDeg, switchers, combinations, results,
  computeConjugateModularInfo}, (*Define switch functions*)
 switchers = <|"Right" → SwitchingRightBoundaryStrip,
   "Left" → SwitchingLeftBoundaryStrip, "Lower" → SwitchingLowerBoundaryStrip,
   "Upper" → SwitchingUpperBoundaryStrip|>;
 (*Computes Mᵢ and pᵢ and prints them,
 with classification*)computeConjugateModularInfo[quad_List] :=
  Module[{abcdList, Ms, summary}, abcdList = computeABCD /@ quad;
   Ms = FullSimplify[Times @@@ abcdList];
   summary = If[AllTrue[Ms, # < 1 &], Style["Mi < 1 for all i = 1, ..., 4",
      Bold], Style["Mi ≥ 1 for some i = 1, ..., 4", Red, Bold]];
   Column[{Style["Mᵢ values:", Bold], Row[{"M1 = ", Ms⟦1⟧, ", M2 = ",
       Ms⟦2⟧, ", M3 = ", Ms⟦3⟧, ", M4 = ", Ms⟦4⟧}], summary}]];
 (*Original anglesDeg check*)
 Print[
  TextCell[Style["\nInitial configuration (no switches applied):", Bold]]];
 Print[MatrixForm[angles]];
 Print[computeConjugateModularInfo[angles]];
 (*Generate all switch combinations (from size 1 to 4)*)
 combinations = Subsets[Keys[switchers], {1, Length[switchers]}];
 (*Evaluate each switched configuration*)results = Table[
  Module[{switched = angles, name, passQ}, name = StringRiffle[combo, " + "];
   Do[switched = switchers[sw][switched], {sw, combo}];
```

```
    passQ = And @@ (checkConditionN0Degrees /@ switched);
    Print[Style["\nSwitch combination: ", Bold], name];
    Print[Style["Switched anglesDeg:", Italic]];
    Print[MatrixForm[switched]];
    Print[computeConjugateModularInfo[switched]];
    {name, passQ}], {combo, combinations}];]
```

```
(*=========================================================================
 =====*)
(*==================================
 NOT CHIMERA=================================*)
(*=========================================================================
 =====*)
Column[
 {TextCell[Style["================= NOT CHIMERA =================", Blue,
    Bold, 16], "Text"],
  TextCell[
   Style["Fails conic, orthodiagonal & isogonal tests for all i=1, ...,
      4 ⇒ NOT chimera. Boundary-strip switches preserve these
      failures as demonstrated in the NOT CONIC, NOT ORTHODIAGONAL,
      and NOT ISOGONAL sections.", GrayLevel[0.3]], "Text"]
}]
```

Out[16]=

================= CONDITION (N.0) =================

✔ All vertices satisfy (N.0).

Vertex	Combinations (mod 360)	Status
Vertex 1	{342.075, 102.075, 255.638, 135.638, 287.012, 80.5752, 47.0121, 200.575}	✔ Pass
Vertex 2	{334.867, 174.867, 315.305, 115.305, 276.196, 56.6343, 116.196, 256.634}	✔ Pass
Vertex 3	{319.476, 149.476, 330.241, 140.241, 92.1432, 272.908, 282.143, 102.908}	✔ Pass
Vertex 4	{332.626, 182.626, 299.113, 89.1129, 117.278, 233.765, 327.278, 83.7651}	✔ Pass

Out[19]=

================= CONDITION (N.3) =================

✔ **M1** = **M2** = **M3** = **M4** = 0.924668

Out[25]=

================= CONDITION (N.4) =================

✔ **r1** = **r2** = 1.13168; ✔ **r3** = **r4** = 0.68379

✔ **s1** = **s4** = 1.17093; ✔ **s2** = **s3** = 1.09802

Out[35]=

================= CONDITION (N.5) =================

⚠ *Approximate validation using*
ε-tolerance. For rigorous proof, see the referenced paper.

✅ **Valid Combination Found (M < 1):**

e1 = −1, **e2** = 1, **e3** = −1

t1 = 0.K + 0.309024iK'

t2 = 0.K + 0.502198iK'

t3 = 1.K + 0.519082iK'

t4 = 1.K + 0.325908iK'

t1 + **e1*t2** + **e2*t3** + **e3*t4** = 0.K + -3.33067×10^{-16}iK'

Out[38]=

================= OTHER PARAMETERS =================

u = 0.0753316

σ1 = 2.98516, **σ2** = 2.92226, **σ3** = 2.78795, **σ4** = 2.90271

σ1 ≈ 171.037°, **σ2** ≈ 167.433°, **σ3** ≈ 159.738°, **σ4** ≈ 166.313°

cosσ1 = −0.98779, **cosσ2** = −0.976043, **cosσ3** = −0.938119, **cosσ4** = −0.971603

f1 = 1.0682, **f2** = 1.27867, **f3** = 0.70414, **f4** = 0.857702

z1 = 14.6629, **z2** = 3.5885, **z3** = −3.37998, **z4** = −7.02752

x1 = 7.59444, **x2** = 7.59444, **x3** = −3.16246, **x4** = −3.16246

y1 = 5.85051, **y2** = 10.2019, **y3** = 10.2019, **y4** = 5.85051

p1 = 0.362871 , **p2** = 0.362871 , **p3** = 0. + 0.562325 i , **p4** = 0. + 0.562325 i

q1 = 0.413431, **q2** = 0.313084, **q3** = 0.313084, **q4** = 0.413431

p1·q1 = 0.150022 , **p2·q2** = 0.113609

, **p3·q3** = 0. + 0.176055 i , **p4·q4** = 0. + 0.232483 i

Out[44]=

================= FLEXIBILITY (FLEXION 1) =================

$$P_1[Z, W1] = \frac{1}{(1.93074 + 1.\ t^2)^2} \Big(-2.41619 \times 10^{-15} + t \Big(-5.77316 \times 10^{-15} \sqrt{-1 + 8.16654\ t^2 - 4.34478\ t^4} + t \Big(2.00199 \times 10^{-14} - 1.16063 \times 10^{-14}\ t^2 + 2.67507 \times 10^{-15}\ t^4 + 3.55271 \times 10^{-15}\ t \sqrt{-1 + 8.16654\ t^2 - 4.34478\ t^4}\Big)\Big)\Big)$$

$$P_2[Z, W2] = \frac{1}{(0.472516 + 1.\ t^2)^2} \Big(1.9458 \times 10^{-16} + t \Big(8.88178 \times 10^{-16} \sqrt{-1 + 8.16654\ t^2 - 4.34478\ t^4} + t \Big(-2.18592 \times 10^{-15} - 6.62401 \times 10^{-17}\ t^2 + 1.3248 \times 10^{-16}\ t^4 + 3.88578 \times 10^{-16}\ t \sqrt{-1 + 8.16654\ t^2 - 4.34478\ t^4}\Big)\Big)\Big)$$

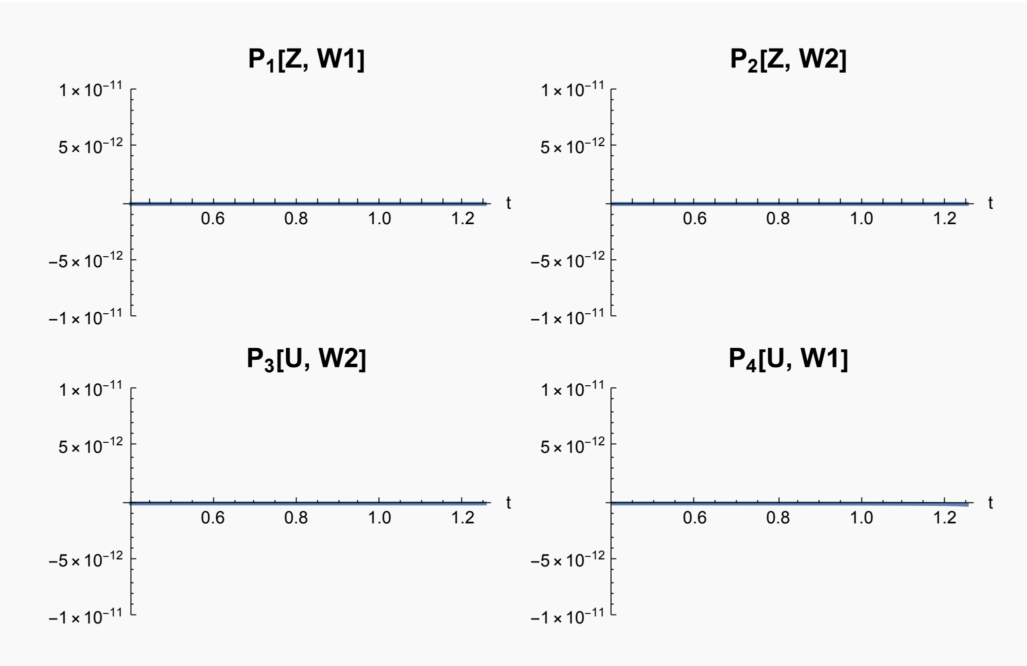
$$P_3[U, W2] = \frac{1}{(0.824332 + 1.27204\ t^2 - 1.\ t^4)^2} \Big(1.68121 \times 10^{-16} + t \Big(-3.78271 \times 10^{-15} \sqrt{-1 + 8.16654\ t^2 - 4.34478\ t^4} + t \Big(1.1096 \times 10^{-14} + t \Big(-5.37986 \times 10^{-15} \sqrt{-1 + 8.16654\ t^2 - 4.34478\ t^4} + t \Big(8.74227 \times 10^{-15} - 2.03426 \times 10^{-14}\ t^2 + 6.85092 \times 10^{-15}\ t^4 + 4.37114 \times 10^{-15}\ t \sqrt{-1 + 8.16654\ t^2 - 4.34478\ t^4}\Big)\Big)\Big)\Big)\Big)$$

$$P_4[U, W1] = \frac{1}{(3.36829 - 0.186184\ t^2 - 1.\ t^4)^2} \Big(2.78246 \times 10^{-15} + t \Big(-4.47977 \times 10^{-14} \sqrt{-1 + 8.16654\ t^2 - 4.34478\ t^4} + t \Big(4.89714 \times 10^{-14} + t \Big(2.22597 \times 10^{-15} \sqrt{-1 + 8.16654\ t^2 - 4.34478\ t^4} + t \Big(-7.5683 \times 10^{-14} - 6.67791 \times 10^{-15}\ t^2 + 1.81556 \times 10^{-14}\ t^4 + 1.00169 \times 10^{-14}\ t \sqrt{-1 + 8.16654\ t^2 - 4.34478\ t^4}\Big)\Big)\Big)\Big)\Big)$$

Out[53]=

================= FLEXIBILITY (FLEXION 1) =================

Polynomials P_i(t) built from Bricard's equations for flexion 1.



Out[59]=

================= FLEXIBILITY (FLEXION 2) =================

$$P_1[Z, W1] = \frac{1}{(1.93074 + 1.\,t^2)^2}\Big(-2.41619\times10^{-15} + t\,\Big(5.77316\times10^{-15}\sqrt{-1+8.16654\,t^2-4.34478\,t^4} + t\,\big(2.00199\times10^{-14} - 1.16063\times10^{-14}\,t^2 + 2.67507\times10^{-15}\,t^4 - 3.55271\times10^{-15}\,t\sqrt{-1+8.16654\,t^2-4.34478\,t^4}\big)\Big)\Big)$$

$$P_2[Z, W2] = \frac{1}{(0.472516 + 1.\,t^2)^2}\Big(1.9458\times10^{-16} + t\,\Big(-8.88178\times10^{-16}\sqrt{-1+8.16654\,t^2-4.34478\,t^4} + t\,\big(-2.18592\times10^{-15} - 6.62401\times10^{-17}\,t^2 + 1.3248\times10^{-16}\,t^4 - 3.88578\times10^{-16}\,t\sqrt{-1+8.16654\,t^2-4.34478\,t^4}\big)\Big)\Big)$$

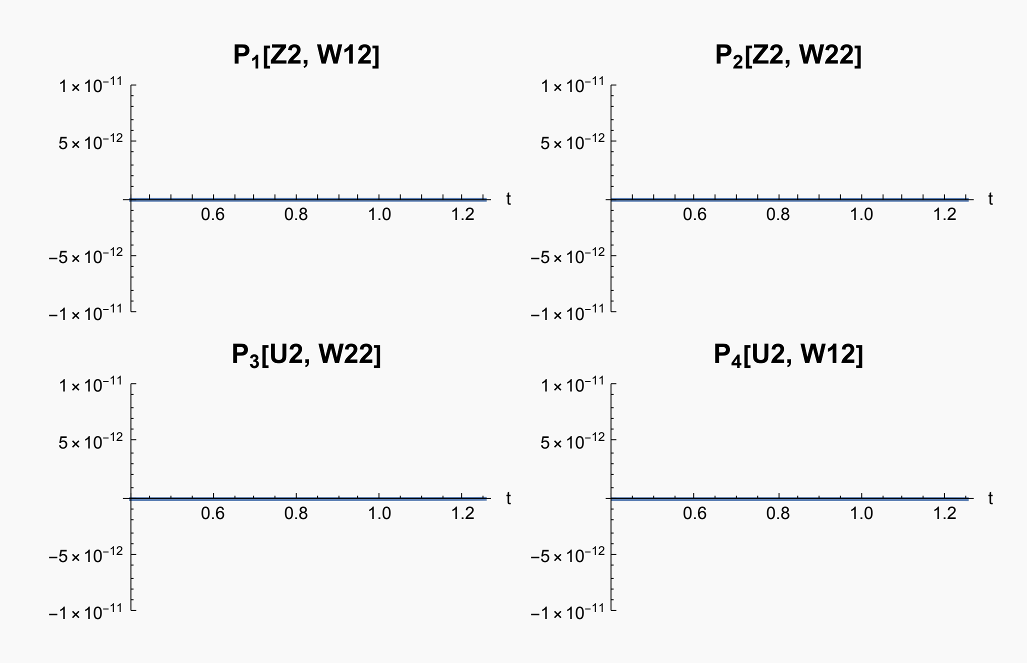
$$P_3[U, W2] = \frac{1}{(0.824332 + 1.27204\,t^2 - 1.\,t^4)^2}\Big(1.68121\times10^{-16} + t\,\Big(3.78271\times10^{-15}\sqrt{-1+8.16654\,t^2-4.34478\,t^4} + t\,\Big(1.1096\times10^{-14} + t\,\Big(5.37986\times10^{-15}\sqrt{-1+8.16654\,t^2-4.34478\,t^4} + t\,\big(8.74227\times10^{-15} - 2.03426\times10^{-14}\,t^2 + 6.85092\times10^{-15}\,t^4 - 4.37114\times10^{-15}\,t\sqrt{-1+8.16654\,t^2-4.34478\,t^4}\big)\Big)\Big)\Big)\Big)$$

$$P_4[U, W1] = \frac{1}{(3.36829 - 0.186184\,t^2 - 1.\,t^4)^2}\Big(2.78246\times10^{-15} + t\,\Big(4.47977\times10^{-14}\sqrt{-1+8.16654\,t^2-4.34478\,t^4} + t\,\Big(4.89714\times10^{-14} + t\,\Big(-2.22597\times10^{-15}\sqrt{-1+8.16654\,t^2-4.34478\,t^4} + t\,\big(-7.5683\times10^{-14} - 6.67791\times10^{-15}\,t^2 + 1.81556\times10^{-14}\,t^4 - 1.00169\times10^{-14}\,t\sqrt{-1+8.16654\,t^2-4.34478\,t^4}\big)\Big)\Big)\Big)\Big)$$

Out[68]=

================= FLEXIBILITY (FLEXION 2) =================

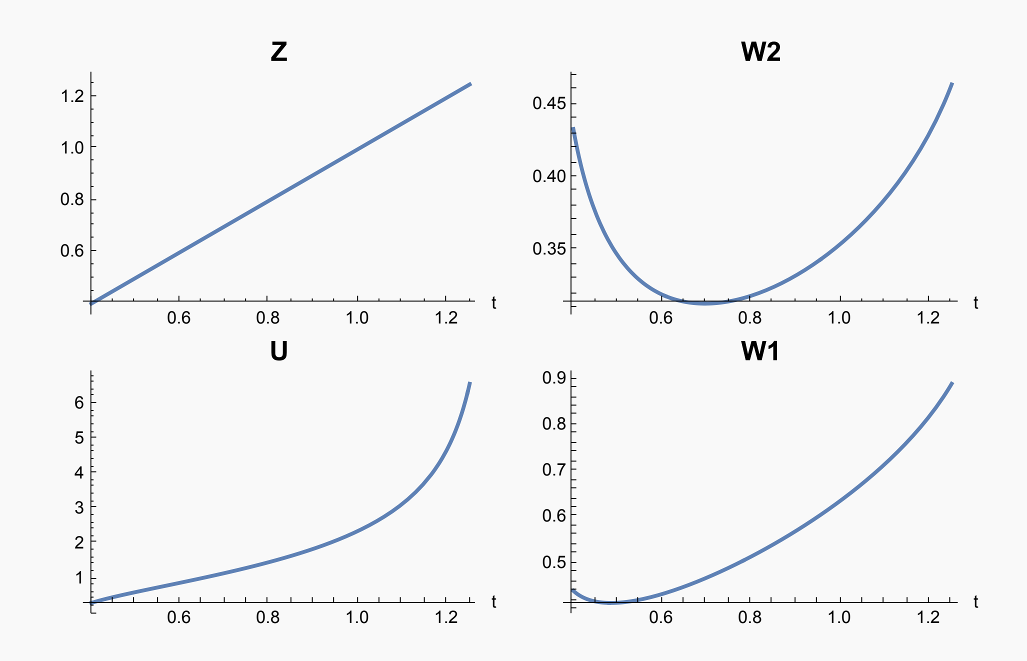
Polynomials P_i(t) built from Bricard’s equations for flexion 2.



Out[73]=

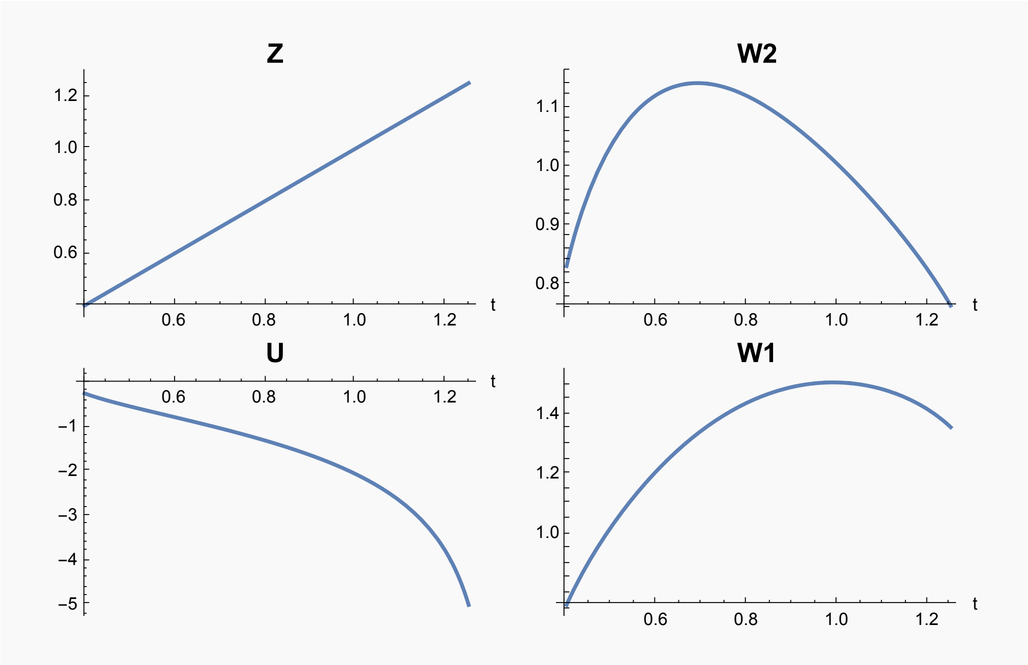
================= NOT TRIVIAL (FLEXION 1) =================

This configuration does not belong to the trivial class – even after switching the boundary strips – since none of the functions Z, W2, U, or W1 is constant.



Out[76]=

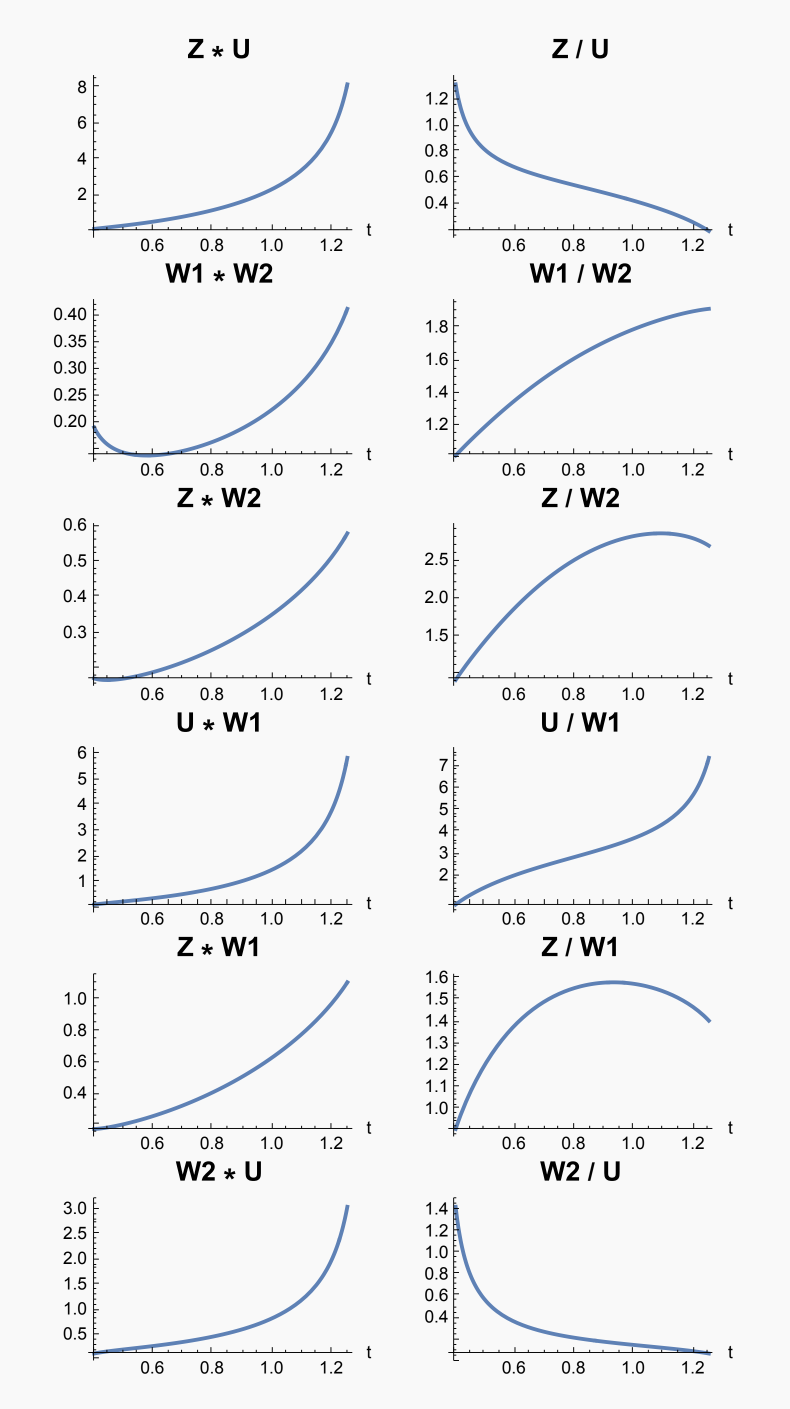
```
================= NOT TRIVIAL (FLEXION 2) =================
This configuration does not belong to the trivial
  class — even after switching the boundary strips —
  since none of the functions Z, W2, U, or W1 is constant.
```



Out[81]=

============= NOT LINEAR COMPOUND & NOT LINEAR CONJUGATE (FLEXION 1) =============

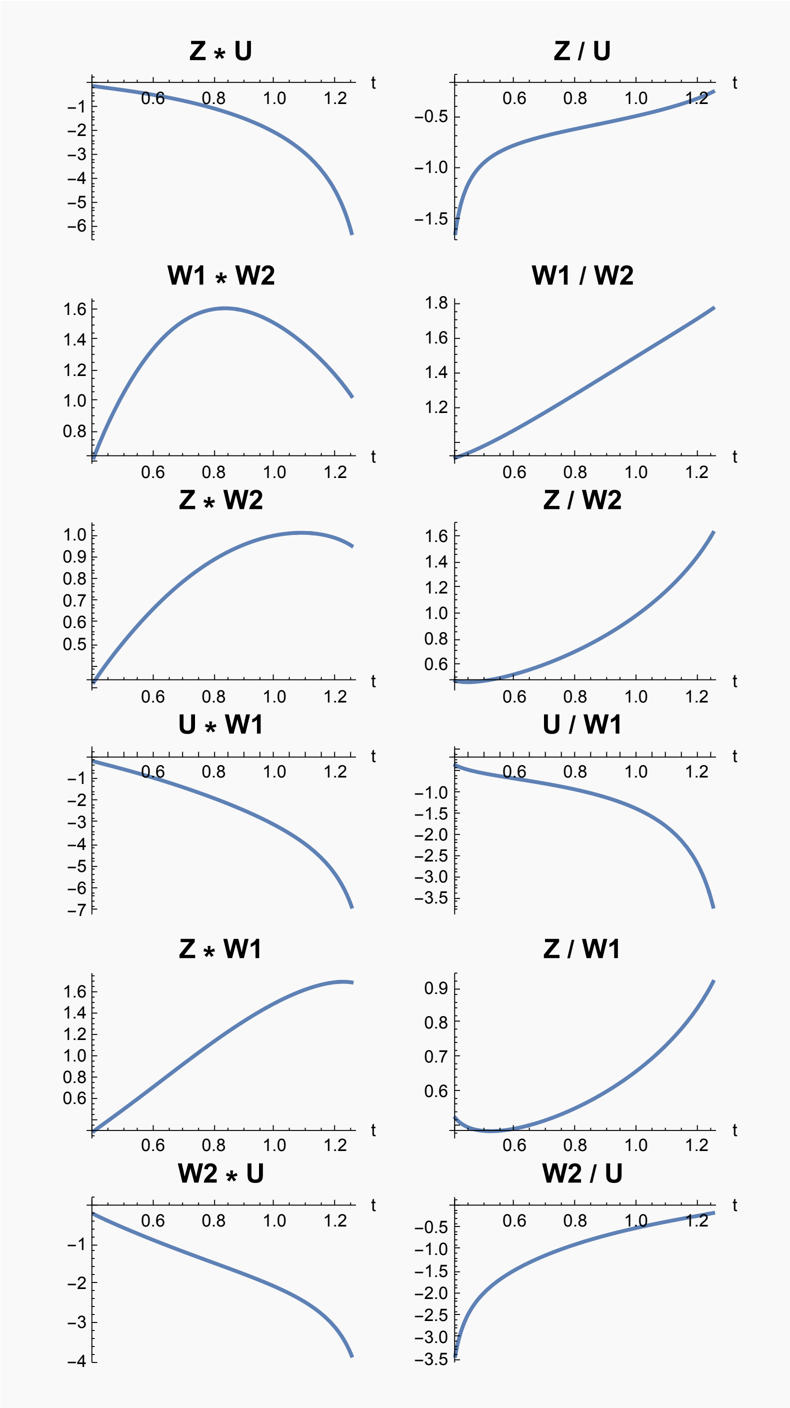
This configuration does not belong to the Linear compound class nor to the linear conjugate class — even after switching the boundary strips — since none of the functions ZU, Z/U, W1W2, W1/W2, ZW2, Z/W2, UW1, and U/W1 is constant. In addition, none of ZW1, Z/W1, W2U, W2/U is constant as well.



Out[84]=

============= NOT LINEAR COMPOUND &
NOT LINEAR CONJUGATE (FLEXION 2) =============

This configuration does not belong to the Linear compound class nor to the linear conjugate class — even after switching the boundary strips — since none of the functions ZU, Z/U, W1W2, W1/W2, ZW2, Z/W2, UW1, and U/W1 is constant. In addition, none of ZW1, Z/W1, W2U, W2/U is constant as well.



Out[93]=

================= NOT CONIC =================

Condition (N.0) is satisfied ⇒ this configuration is NOT equimodular-conic. Applying any boundary-strip switch still preserves (N.0), so no conic form emerges.

Out[94]=

CONDITION (N.0) AFTER SWITCHING BOUNDARY STRIPS

Right: Condition (N.0) is still satisfied.
Left: Condition (N.0) is still satisfied.
Lower: Condition (N.0) is still satisfied.
Upper: Condition (N.0) is still satisfied.
Right + Left: Condition (N.0) is still satisfied.
Right + Lower: Condition (N.0) is still satisfied.
Right + Upper: Condition (N.0) is still satisfied.
Left + Lower: Condition (N.0) is still satisfied.
Left + Upper: Condition (N.0) is still satisfied.
Lower + Upper: Condition (N.0) is still satisfied.
Right + Left + Lower: Condition (N.0) is still satisfied.
Right + Left + Upper: Condition (N.0) is still satisfied.
Right + Lower + Upper: Condition (N.0) is still satisfied.
Left + Lower + Upper: Condition (N.0) is still satisfied.
Right + Left + Lower + Upper: Condition (N.0) is still satisfied.

Out[95]=

================= NOT ORTHODIAGONAL =================

$\cos(\alpha_i)\cdot\cos(\gamma_i) \neq \cos(\beta_i)\cdot\cos(\delta_i)$ for each $i = 1\ldots4$ ⇒ NOT orthodiagonal. Switching boundary strips does not correct this.

Initial anglesDeg (no switches):

$$\begin{pmatrix} 91.3249 & 27.5312 & 103.218 & 120 \\ 115.75 & 29.3354 & 109.781 & 80 \\ 31.192 & 113.666 & 89.6176 & 85 \\ 28.1955 & 107.674 & 121.757 & 75 \end{pmatrix}$$

Orthodiagonal check: $\cos(\alpha_i)\cdot\cos(\gamma_i) - \cos(\beta_i)\cdot\cos(\delta_i)$ *for* $i = 1..4$

$\cos(\alpha1)\cdot\cos(\gamma1) - \cos(\beta1)\cdot\cos(\delta1) = 0.449$
$\cos(\alpha2)\cdot\cos(\gamma2) - \cos(\beta2)\cdot\cos(\delta2) = -0.004$
$\cos(\alpha3)\cdot\cos(\gamma3) - \cos(\beta3)\cdot\cos(\delta3) = 0.041$
$\cos(\alpha4)\cdot\cos(\gamma4) - \cos(\beta4)\cdot\cos(\delta4) = -0.385$

Switch combination: Right

Switched anglesDeg:

$$\begin{pmatrix} 91.3249 & 152.469 & 76.7816 & 120 \\ 115.75 & 29.3354 & 109.781 & 80 \\ 31.192 & 113.666 & 89.6176 & 85 \\ 28.1955 & 72.3261 & 58.2435 & 75 \end{pmatrix}$$

Orthodiagonal check: $\cos(\alpha_i)\cdot\cos(\gamma_i) - \cos(\beta_i)\cdot\cos(\delta_i)$ *for* $i = 1..4$

$\cos(\alpha1)\cdot\cos(\gamma1) - \cos(\beta1)\cdot\cos(\delta1) = -0.449$
$\cos(\alpha2)\cdot\cos(\gamma2) - \cos(\beta2)\cdot\cos(\delta2) = -0.004$
$\cos(\alpha3)\cdot\cos(\gamma3) - \cos(\beta3)\cdot\cos(\delta3) = 0.041$
$\cos(\alpha4)\cdot\cos(\gamma4) - \cos(\beta4)\cdot\cos(\delta4) = 0.385$

Switch combination: Left

Switched anglesDeg:

$$\begin{pmatrix} 91.3249 & 27.5312 & 103.218 & 120 \\ 115.75 & 150.665 & 70.2192 & 80 \\ 31.192 & 66.3336 & 90.3824 & 85 \\ 28.1955 & 107.674 & 121.757 & 75 \end{pmatrix}$$

Orthodiagonal check: $\cos(\alpha_i)\cdot\cos(\gamma_i) - \cos(\beta_i)\cdot\cos(\delta_i)$ *for* $i = 1..4$

$\cos(\alpha 1)\cdot\cos(\gamma 1) - \cos(\beta 1)\cdot\cos(\delta 1) = 0.449$
$\cos(\alpha 2)\cdot\cos(\gamma 2) - \cos(\beta 2)\cdot\cos(\delta 2) = 0.004$
$\cos(\alpha 3)\cdot\cos(\gamma 3) - \cos(\beta 3)\cdot\cos(\delta 3) = -0.041$
$\cos(\alpha 4)\cdot\cos(\gamma 4) - \cos(\beta 4)\cdot\cos(\delta 4) = -0.385$

Switch combination: Lower

Switched anglesDeg:

$$\begin{pmatrix} 88.6751 & 152.469 & 103.218 & 120 \\ 64.2495 & 150.665 & 109.781 & 80 \\ 31.192 & 113.666 & 89.6176 & 85 \\ 28.1955 & 107.674 & 121.757 & 75 \end{pmatrix}$$

Orthodiagonal check: $\cos(\alpha_i)\cdot\cos(\gamma_i) - \cos(\beta_i)\cdot\cos(\delta_i)$ *for* $i = 1..4$

$\cos(\alpha 1)\cdot\cos(\gamma 1) - \cos(\beta 1)\cdot\cos(\delta 1) = -0.449$
$\cos(\alpha 2)\cdot\cos(\gamma 2) - \cos(\beta 2)\cdot\cos(\delta 2) = 0.004$
$\cos(\alpha 3)\cdot\cos(\gamma 3) - \cos(\beta 3)\cdot\cos(\delta 3) = 0.041$
$\cos(\alpha 4)\cdot\cos(\gamma 4) - \cos(\beta 4)\cdot\cos(\delta 4) = -0.385$

Switch combination: Upper

Switched anglesDeg:

$$\begin{pmatrix} 91.3249 & 27.5312 & 103.218 & 120 \\ 115.75 & 29.3354 & 109.781 & 80 \\ 148.808 & 66.3336 & 89.6176 & 85 \\ 151.804 & 72.3261 & 121.757 & 75 \end{pmatrix}$$

Orthodiagonal check: $\cos(\alpha_i)\cdot\cos(\gamma_i) - \cos(\beta_i)\cdot\cos(\delta_i)$ *for* $i = 1..4$

$\cos(\alpha 1)\cdot\cos(\gamma 1) - \cos(\beta 1)\cdot\cos(\delta 1) = 0.449$
$\cos(\alpha 2)\cdot\cos(\gamma 2) - \cos(\beta 2)\cdot\cos(\delta 2) = -0.004$
$\cos(\alpha 3)\cdot\cos(\gamma 3) - \cos(\beta 3)\cdot\cos(\delta 3) = -0.041$
$\cos(\alpha 4)\cdot\cos(\gamma 4) - \cos(\beta 4)\cdot\cos(\delta 4) = 0.385$

Switch combination: Right + Left

Switched anglesDeg:

$$\begin{pmatrix} 91.3249 & 152.469 & 76.7816 & 120 \\ 115.75 & 150.665 & 70.2192 & 80 \\ 31.192 & 66.3336 & 90.3824 & 85 \\ 28.1955 & 72.3261 & 58.2435 & 75 \end{pmatrix}$$

Orthodiagonal check: $\cos(\alpha_i)\cdot\cos(\gamma_i) - \cos(\beta_i)\cdot\cos(\delta_i)$ *for* $i = 1..4$

$\cos(\alpha 1)\cdot\cos(\gamma 1) - \cos(\beta 1)\cdot\cos(\delta 1) = -0.449$
$\cos(\alpha 2)\cdot\cos(\gamma 2) - \cos(\beta 2)\cdot\cos(\delta 2) = 0.004$
$\cos(\alpha 3)\cdot\cos(\gamma 3) - \cos(\beta 3)\cdot\cos(\delta 3) = -0.041$
$\cos(\alpha 4)\cdot\cos(\gamma 4) - \cos(\beta 4)\cdot\cos(\delta 4) = 0.385$

Switch combination: Right + Lower

Switched anglesDeg:

$$\begin{pmatrix} 88.6751 & 27.5312 & 76.7816 & 120 \\ 64.2495 & 150.665 & 109.781 & 80 \\ 31.192 & 113.666 & 89.6176 & 85 \\ 28.1955 & 72.3261 & 58.2435 & 75 \end{pmatrix}$$

Orthodiagonal check: $\cos(\alpha_i)\cdot\cos(\gamma_i) - \cos(\beta_i)\cdot\cos(\delta_i)$ *for* $i = 1..4$

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$\cos(\alpha2)\cdot\cos(\gamma2) - \cos(\beta2)\cdot\cos(\delta2) = 0.004$
$\cos(\alpha3)\cdot\cos(\gamma3) - \cos(\beta3)\cdot\cos(\delta3) = 0.041$
$\cos(\alpha4)\cdot\cos(\gamma4) - \cos(\beta4)\cdot\cos(\delta4) = 0.385$

Switch combination: Right + Upper

Switched anglesDeg:

$$\begin{pmatrix} 91.3249 & 152.469 & 76.7816 & 120 \\ 115.75 & 29.3354 & 109.781 & 80 \\ 148.808 & 66.3336 & 89.6176 & 85 \\ 151.804 & 107.674 & 58.2435 & 75 \end{pmatrix}$$

Orthodiagonal check: $\cos(\alpha_i)\cdot\cos(\gamma_i) - \cos(\beta_i)\cdot\cos(\delta_i)$ *for* $i = 1..4$

$\cos(\alpha1)\cdot\cos(\gamma1) - \cos(\beta1)\cdot\cos(\delta1) = -0.449$
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$\cos(\alpha3)\cdot\cos(\gamma3) - \cos(\beta3)\cdot\cos(\delta3) = -0.041$
$\cos(\alpha4)\cdot\cos(\gamma4) - \cos(\beta4)\cdot\cos(\delta4) = -0.385$

Switch combination: Left + Lower

Switched anglesDeg:

$$\begin{pmatrix} 88.6751 & 152.469 & 103.218 & 120 \\ 64.2495 & 29.3354 & 70.2192 & 80 \\ 31.192 & 66.3336 & 90.3824 & 85 \\ 28.1955 & 107.674 & 121.757 & 75 \end{pmatrix}$$

Orthodiagonal check: $\cos(\alpha_i)\cdot\cos(\gamma_i) - \cos(\beta_i)\cdot\cos(\delta_i)$ *for* $i = 1..4$

$\cos(\alpha1)\cdot\cos(\gamma1) - \cos(\beta1)\cdot\cos(\delta1) = -0.449$
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$\cos(\alpha3)\cdot\cos(\gamma3) - \cos(\beta3)\cdot\cos(\delta3) = -0.041$
$\cos(\alpha4)\cdot\cos(\gamma4) - \cos(\beta4)\cdot\cos(\delta4) = -0.385$

Switch combination: Left + Upper

Switched anglesDeg:

$$\begin{pmatrix} 91.3249 & 27.5312 & 103.218 & 120 \\ 115.75 & 150.665 & 70.2192 & 80 \\ 148.808 & 113.666 & 90.3824 & 85 \\ 151.804 & 72.3261 & 121.757 & 75 \end{pmatrix}$$

Orthodiagonal check: $\cos(\alpha_i)\cdot\cos(\gamma_i) - \cos(\beta_i)\cdot\cos(\delta_i)$ *for* $i = 1..4$

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$\cos(\alpha3)\cdot\cos(\gamma3) - \cos(\beta3)\cdot\cos(\delta3) = 0.041$
$\cos(\alpha4)\cdot\cos(\gamma4) - \cos(\beta4)\cdot\cos(\delta4) = 0.385$

Switch combination: Lower + Upper

Switched anglesDeg:

$$\begin{pmatrix} 88.6751 & 152.469 & 103.218 & 120 \\ 64.2495 & 150.665 & 109.781 & 80 \\ 148.808 & 66.3336 & 89.6176 & 85 \\ 151.804 & 72.3261 & 121.757 & 75 \end{pmatrix}$$

Orthodiagonal check: $\cos(\alpha_i)\cdot\cos(\gamma_i) - \cos(\beta_i)\cdot\cos(\delta_i)$ *for* $i = 1..4$

$\cos(\alpha 1)\cdot\cos(\gamma 1) - \cos(\beta 1)\cdot\cos(\delta 1) = -0.449$
$\cos(\alpha 2)\cdot\cos(\gamma 2) - \cos(\beta 2)\cdot\cos(\delta 2) = 0.004$
$\cos(\alpha 3)\cdot\cos(\gamma 3) - \cos(\beta 3)\cdot\cos(\delta 3) = -0.041$
$\cos(\alpha 4)\cdot\cos(\gamma 4) - \cos(\beta 4)\cdot\cos(\delta 4) = 0.385$

Switch combination: Right + Left + Lower

Switched anglesDeg:

$$\begin{pmatrix} 88.6751 & 27.5312 & 76.7816 & 120 \\ 64.2495 & 29.3354 & 70.2192 & 80 \\ 31.192 & 66.3336 & 90.3824 & 85 \\ 28.1955 & 72.3261 & 58.2435 & 75 \end{pmatrix}$$

Orthodiagonal check: $\cos(\alpha_i)\cdot\cos(\gamma_i) - \cos(\beta_i)\cdot\cos(\delta_i)$ *for* $i = 1..4$

$\cos(\alpha 1)\cdot\cos(\gamma 1) - \cos(\beta 1)\cdot\cos(\delta 1) = 0.449$
$\cos(\alpha 2)\cdot\cos(\gamma 2) - \cos(\beta 2)\cdot\cos(\delta 2) = -0.004$
$\cos(\alpha 3)\cdot\cos(\gamma 3) - \cos(\beta 3)\cdot\cos(\delta 3) = -0.041$
$\cos(\alpha 4)\cdot\cos(\gamma 4) - \cos(\beta 4)\cdot\cos(\delta 4) = 0.385$

Switch combination: Right + Left + Upper

Switched anglesDeg:

$$\begin{pmatrix} 91.3249 & 152.469 & 76.7816 & 120 \\ 115.75 & 150.665 & 70.2192 & 80 \\ 148.808 & 113.666 & 90.3824 & 85 \\ 151.804 & 107.674 & 58.2435 & 75 \end{pmatrix}$$

Orthodiagonal check: $\cos(\alpha_i)\cdot\cos(\gamma_i) - \cos(\beta_i)\cdot\cos(\delta_i)$ *for* $i = 1..4$

$\cos(\alpha 1)\cdot\cos(\gamma 1) - \cos(\beta 1)\cdot\cos(\delta 1) = -0.449$
$\cos(\alpha 2)\cdot\cos(\gamma 2) - \cos(\beta 2)\cdot\cos(\delta 2) = 0.004$
$\cos(\alpha 3)\cdot\cos(\gamma 3) - \cos(\beta 3)\cdot\cos(\delta 3) = 0.041$
$\cos(\alpha 4)\cdot\cos(\gamma 4) - \cos(\beta 4)\cdot\cos(\delta 4) = -0.385$

Switch combination: Right + Lower + Upper

Switched anglesDeg:

$$\begin{pmatrix} 88.6751 & 27.5312 & 76.7816 & 120 \\ 64.2495 & 150.665 & 109.781 & 80 \\ 148.808 & 66.3336 & 89.6176 & 85 \\ 151.804 & 107.674 & 58.2435 & 75 \end{pmatrix}$$

Orthodiagonal check: $\cos(\alpha_i)\cdot\cos(\gamma_i) - \cos(\beta_i)\cdot\cos(\delta_i)$ *for* $i = 1..4$

$\cos(\alpha 1)\cdot\cos(\gamma 1) - \cos(\beta 1)\cdot\cos(\delta 1) = 0.449$
$\cos(\alpha 2)\cdot\cos(\gamma 2) - \cos(\beta 2)\cdot\cos(\delta 2) = 0.004$
$\cos(\alpha 3)\cdot\cos(\gamma 3) - \cos(\beta 3)\cdot\cos(\delta 3) = -0.041$
$\cos(\alpha 4)\cdot\cos(\gamma 4) - \cos(\beta 4)\cdot\cos(\delta 4) = -0.385$

Switch combination: Left + Lower + Upper

Switched anglesDeg:

$$\begin{pmatrix} 88.6751 & 152.469 & 103.218 & 120 \\ 64.2495 & 29.3354 & 70.2192 & 80 \\ 148.808 & 113.666 & 90.3824 & 85 \\ 151.804 & 72.3261 & 121.757 & 75 \end{pmatrix}$$

Orthodiagonal check: $\cos(\alpha_i)\cdot\cos(\gamma_i) - \cos(\beta_i)\cdot\cos(\delta_i)$ *for i = 1..4*

$\cos(\alpha1)\cdot\cos(\gamma1) - \cos(\beta1)\cdot\cos(\delta1) = -0.449$
$\cos(\alpha2)\cdot\cos(\gamma2) - \cos(\beta2)\cdot\cos(\delta2) = -0.004$
$\cos(\alpha3)\cdot\cos(\gamma3) - \cos(\beta3)\cdot\cos(\delta3) = 0.041$
$\cos(\alpha4)\cdot\cos(\gamma4) - \cos(\beta4)\cdot\cos(\delta4) = 0.385$

Switch combination: Right + Left + Lower + Upper

Switched anglesDeg:

$$\begin{pmatrix} 88.6751 & 27.5312 & 76.7816 & 120 \\ 64.2495 & 29.3354 & 70.2192 & 80 \\ 148.808 & 113.666 & 90.3824 & 85 \\ 151.804 & 107.674 & 58.2435 & 75 \end{pmatrix}$$

Orthodiagonal check: $\cos(\alpha_i)\cdot\cos(\gamma_i) - \cos(\beta_i)\cdot\cos(\delta_i)$ *for i = 1..4*

$\cos(\alpha1)\cdot\cos(\gamma1) - \cos(\beta1)\cdot\cos(\delta1) = 0.449$
$\cos(\alpha2)\cdot\cos(\gamma2) - \cos(\beta2)\cdot\cos(\delta2) = -0.004$
$\cos(\alpha3)\cdot\cos(\gamma3) - \cos(\beta3)\cdot\cos(\delta3) = 0.041$
$\cos(\alpha4)\cdot\cos(\gamma4) - \cos(\beta4)\cdot\cos(\delta4) = -0.385$

Out[97]=

================= NOT ISOGONAL =================

Condition (N.0) holds AND for all i = 1…4: $\alpha_i \neq \beta_i$, $\alpha_i \neq \gamma_i$, $\alpha_i \neq \delta_i$, $\beta_i \neq \gamma_i$, $\beta_i \neq \delta_i$, $\gamma_i \neq \delta_i$, $\alpha_i+\beta_i \neq \pi \neq \gamma_i+\delta_i$, $\alpha_i+\gamma_i \neq \pi \neq \beta_i+\delta_i$, $\alpha_i+\delta_i \neq \pi \neq \beta_i+\gamma_i \Rightarrow$ NOT isogonal. Switching boundary strips do not change this.

Initial anglesDeg (no switches):

$$\begin{pmatrix} 91.3249 & 27.5312 & 103.218 & 120 \\ 115.75 & 29.3354 & 109.781 & 80 \\ 31.192 & 113.666 & 89.6176 & 85 \\ 28.1955 & 107.674 & 121.757 & 75 \end{pmatrix}$$

Angle relation checks for i = 1..4:

Vertex 1

$\alpha1 - \beta1 = 63.794$
$\alpha1 - \gamma1 = -11.894$
$\alpha1 - \delta1 = -28.675$
$\beta1 - \gamma1 = -75.687$
$\beta1 - \delta1 = -92.469$
$\gamma1 - \delta1 = -16.782$
$\alpha1 + \beta1 - 180 = -61.144$
$\gamma1 + \delta1 - 180 = 43.218$
$\alpha1 + \gamma1 - 180 = 14.543$
$\beta1 + \delta1 - 180 = -32.469$
$\alpha1 + \delta1 - 180 = 31.325$
$\beta1 + \gamma1 - 180 = -49.250$
$\alpha1 + \beta1 - \gamma1 - \delta1 = -104.360$
$\alpha1 + \gamma1 - \beta1 - \delta1 = 47.012$
$\alpha1 + \delta1 - \beta1 - \gamma1 = 80.575$

Vertex 2

$\alpha2 - \beta2 = 86.415$

$\alpha2 - \beta2 = 86.415$
$\alpha2 - \gamma2 = 5.970$
$\alpha2 - \delta2 = 35.750$
$\beta2 - \gamma2 = -80.445$
$\beta2 - \delta2 = -50.665$
$\gamma2 - \delta2 = 29.781$
$\alpha2 + \beta2 - 180 = -34.914$
$\gamma2 + \delta2 - 180 = 9.781$
$\alpha2 + \gamma2 - 180 = 45.531$
$\beta2 + \delta2 - 180 = -70.665$
$\alpha2 + \delta2 - 180 = 15.750$
$\beta2 + \gamma2 - 180 = -40.884$
$\alpha2 + \beta2 - \gamma2 - \delta2 = -44.695$
$\alpha2 + \gamma2 - \beta2 - \delta2 = 116.200$
$\alpha2 + \delta2 - \beta2 - \gamma2 = 56.634$

Vertex 3
$\alpha3 - \beta3 = -82.474$
$\alpha3 - \gamma3 = -58.426$
$\alpha3 - \delta3 = -53.808$
$\beta3 - \gamma3 = 24.049$
$\beta3 - \delta3 = 28.666$
$\gamma3 - \delta3 = 4.618$
$\alpha3 + \beta3 - 180 = -35.142$
$\gamma3 + \delta3 - 180 = -5.382$
$\alpha3 + \gamma3 - 180 = -59.190$
$\beta3 + \delta3 - 180 = 18.666$
$\alpha3 + \delta3 - 180 = -63.808$
$\beta3 + \gamma3 - 180 = 23.284$
$\alpha3 + \beta3 - \gamma3 - \delta3 = -29.759$
$\alpha3 + \gamma3 - \beta3 - \delta3 = -77.857$
$\alpha3 + \delta3 - \beta3 - \gamma3 = -87.092$

Vertex 4
$\alpha4 - \beta4 = -79.478$
$\alpha4 - \gamma4 = -93.561$
$\alpha4 - \delta4 = -46.804$
$\beta4 - \gamma4 = -14.083$
$\beta4 - \delta4 = 32.674$
$\gamma4 - \delta4 = 46.757$
$\alpha4 + \beta4 - 180 = -44.131$
$\gamma4 + \delta4 - 180 = 16.757$
$\alpha4 + \gamma4 - 180 = -30.048$
$\beta4 + \delta4 - 180 = 2.674$
$\alpha4 + \delta4 - 180 = -76.804$
$\beta4 + \gamma4 - 180 = 49.430$
$\alpha4 + \beta4 - \gamma4 - \delta4 = -60.887$
$\alpha4 + \gamma4 - \beta4 - \delta4 = -32.722$
$\alpha4 + \delta4 - \beta4 - \gamma4 = -126.230$

Switch combination: Right

Switched anglesDeg:

$$\begin{pmatrix} 91.3249 & 152.469 & 76.7816 & 120 \\ 115.75 & 29.3354 & 109.781 & 80 \\ 31.192 & 113.666 & 89.6176 & 85 \\ 28.1955 & 72.3261 & 58.2435 & 75 \end{pmatrix}$$

Angle relation checks for i = 1..4:

Vertex 1
$\alpha1 - \beta1 = -61.144$
$\alpha1 - \gamma1 = 14.543$

$\alpha 1 - \gamma 1 = 14.543$
$\alpha 1 - \delta 1 = -28.675$
$\beta 1 - \gamma 1 = 75.687$
$\beta 1 - \delta 1 = 32.469$
$\gamma 1 - \delta 1 = -43.218$
$\alpha 1 + \beta 1 - 180 = 63.794$
$\gamma 1 + \delta 1 - 180 = 16.782$
$\alpha 1 + \gamma 1 - 180 = -11.894$
$\beta 1 + \delta 1 - 180 = 92.469$
$\alpha 1 + \delta 1 - 180 = 31.325$
$\beta 1 + \gamma 1 - 180 = 49.250$
$\alpha 1 + \beta 1 - \gamma 1 - \delta 1 = 47.012$
$\alpha 1 + \gamma 1 - \beta 1 - \delta 1 = -104.360$
$\alpha 1 + \delta 1 - \beta 1 - \gamma 1 = -17.925$

Vertex 2
$\alpha 2 - \beta 2 = 86.415$
$\alpha 2 - \gamma 2 = 5.970$
$\alpha 2 - \delta 2 = 35.750$
$\beta 2 - \gamma 2 = -80.445$
$\beta 2 - \delta 2 = -50.665$
$\gamma 2 - \delta 2 = 29.781$
$\alpha 2 + \beta 2 - 180 = -34.914$
$\gamma 2 + \delta 2 - 180 = 9.781$
$\alpha 2 + \gamma 2 - 180 = 45.531$
$\beta 2 + \delta 2 - 180 = -70.665$
$\alpha 2 + \delta 2 - 180 = 15.750$
$\beta 2 + \gamma 2 - 180 = -40.884$
$\alpha 2 + \beta 2 - \gamma 2 - \delta 2 = -44.695$
$\alpha 2 + \gamma 2 - \beta 2 - \delta 2 = 116.200$
$\alpha 2 + \delta 2 - \beta 2 - \gamma 2 = 56.634$

Vertex 3
$\alpha 3 - \beta 3 = -82.474$
$\alpha 3 - \gamma 3 = -58.426$
$\alpha 3 - \delta 3 = -53.808$
$\beta 3 - \gamma 3 = 24.049$
$\beta 3 - \delta 3 = 28.666$
$\gamma 3 - \delta 3 = 4.618$
$\alpha 3 + \beta 3 - 180 = -35.142$
$\gamma 3 + \delta 3 - 180 = -5.382$
$\alpha 3 + \gamma 3 - 180 = -59.190$
$\beta 3 + \delta 3 - 180 = 18.666$
$\alpha 3 + \delta 3 - 180 = -63.808$
$\beta 3 + \gamma 3 - 180 = 23.284$
$\alpha 3 + \beta 3 - \gamma 3 - \delta 3 = -29.759$
$\alpha 3 + \gamma 3 - \beta 3 - \delta 3 = -77.857$
$\alpha 3 + \delta 3 - \beta 3 - \gamma 3 = -87.092$

Vertex 4
$\alpha 4 - \beta 4 = -44.131$
$\alpha 4 - \gamma 4 = -30.048$
$\alpha 4 - \delta 4 = -46.804$
$\beta 4 - \gamma 4 = 14.083$
$\beta 4 - \delta 4 = -2.674$
$\gamma 4 - \delta 4 = -16.757$
$\alpha 4 + \beta 4 - 180 = -79.478$
$\gamma 4 + \delta 4 - 180 = -46.757$
$\alpha 4 + \gamma 4 - 180 = -93.561$
$\beta 4 + \delta 4 - 180 = -32.674$
$\alpha 4 + \delta 4 - 180 = -76.804$
$\beta 4 + \gamma 4 - 180 = -49.430$

$\alpha4 + \beta4 - \gamma4 - \delta4 = -32.722$
$\alpha4 + \gamma4 - \beta4 - \delta4 = -60.887$
$\alpha4 + \delta4 - \beta4 - \gamma4 = -27.374$

Switch combination: Left

Switched anglesDeg:

$$\begin{pmatrix} 91.3249 & 27.5312 & 103.218 & 120 \\ 115.75 & 150.665 & 70.2192 & 80 \\ 31.192 & 66.3336 & 90.3824 & 85 \\ 28.1955 & 107.674 & 121.757 & 75 \end{pmatrix}$$

Angle relation checks for i = 1..4:

Vertex 1
$\alpha1 - \beta1 = 63.794$
$\alpha1 - \gamma1 = -11.894$
$\alpha1 - \delta1 = -28.675$
$\beta1 - \gamma1 = -75.687$
$\beta1 - \delta1 = -92.469$
$\gamma1 - \delta1 = -16.782$
$\alpha1 + \beta1 - 180 = -61.144$
$\gamma1 + \delta1 - 180 = 43.218$
$\alpha1 + \gamma1 - 180 = 14.543$
$\beta1 + \delta1 - 180 = -32.469$
$\alpha1 + \delta1 - 180 = 31.325$
$\beta1 + \gamma1 - 180 = -49.250$
$\alpha1 + \beta1 - \gamma1 - \delta1 = -104.360$
$\alpha1 + \gamma1 - \beta1 - \delta1 = 47.012$
$\alpha1 + \delta1 - \beta1 - \gamma1 = 80.575$

Vertex 2
$\alpha2 - \beta2 = -34.914$
$\alpha2 - \gamma2 = 45.531$
$\alpha2 - \delta2 = 35.750$
$\beta2 - \gamma2 = 80.445$
$\beta2 - \delta2 = 70.665$
$\gamma2 - \delta2 = -9.781$
$\alpha2 + \beta2 - 180 = 86.415$
$\gamma2 + \delta2 - 180 = -29.781$
$\alpha2 + \gamma2 - 180 = 5.970$
$\beta2 + \delta2 - 180 = 50.665$
$\alpha2 + \delta2 - 180 = 15.750$
$\beta2 + \gamma2 - 180 = 40.884$
$\alpha2 + \beta2 - \gamma2 - \delta2 = 116.200$
$\alpha2 + \gamma2 - \beta2 - \delta2 = -44.695$
$\alpha2 + \delta2 - \beta2 - \gamma2 = -25.133$

Vertex 3
$\alpha3 - \beta3 = -35.142$
$\alpha3 - \gamma3 = -59.190$
$\alpha3 - \delta3 = -53.808$
$\beta3 - \gamma3 = -24.049$
$\beta3 - \delta3 = -18.666$
$\gamma3 - \delta3 = 5.382$
$\alpha3 + \beta3 - 180 = -82.474$
$\gamma3 + \delta3 - 180 = -4.618$
$\alpha3 + \gamma3 - 180 = -58.426$
$\beta3 + \delta3 - 180 = -28.666$
$\alpha3 + \delta3 - 180 = -63.808$
$\beta3 + \gamma3 - 180 = -23.284$
$\alpha3 + \beta3 - \gamma3 - \delta3 = -77.857$

$\alpha 3 + \gamma 3 - \beta 3 - \delta 3 = -29.759$
$\alpha 3 + \delta 3 - \beta 3 - \gamma 3 = -40.524$

Vertex 4
$\alpha 4 - \beta 4 = -79.478$
$\alpha 4 - \gamma 4 = -93.561$
$\alpha 4 - \delta 4 = -46.804$
$\beta 4 - \gamma 4 = -14.083$
$\beta 4 - \delta 4 = 32.674$
$\gamma 4 - \delta 4 = 46.757$
$\alpha 4 + \beta 4 - 180 = -44.131$
$\gamma 4 + \delta 4 - 180 = 16.757$
$\alpha 4 + \gamma 4 - 180 = -30.048$
$\beta 4 + \delta 4 - 180 = 2.674$
$\alpha 4 + \delta 4 - 180 = -76.804$
$\beta 4 + \gamma 4 - 180 = 49.430$
$\alpha 4 + \beta 4 - \gamma 4 - \delta 4 = -60.887$
$\alpha 4 + \gamma 4 - \beta 4 - \delta 4 = -32.722$
$\alpha 4 + \delta 4 - \beta 4 - \gamma 4 = -126.230$

Switch combination: Lower

Switched anglesDeg:

$$\begin{pmatrix} 88.6751 & 152.469 & 103.218 & 120 \\ 64.2495 & 150.665 & 109.781 & 80 \\ 31.192 & 113.666 & 89.6176 & 85 \\ 28.1955 & 107.674 & 121.757 & 75 \end{pmatrix}$$

Angle relation checks for i = 1..4:

Vertex 1
$\alpha 1 - \beta 1 = -63.794$
$\alpha 1 - \gamma 1 = -14.543$
$\alpha 1 - \delta 1 = -31.325$
$\beta 1 - \gamma 1 = 49.250$
$\beta 1 - \delta 1 = 32.469$
$\gamma 1 - \delta 1 = -16.782$
$\alpha 1 + \beta 1 - 180 = 61.144$
$\gamma 1 + \delta 1 - 180 = 43.218$
$\alpha 1 + \gamma 1 - 180 = 11.894$
$\beta 1 + \delta 1 - 180 = 92.469$
$\alpha 1 + \delta 1 - 180 = 28.675$
$\beta 1 + \gamma 1 - 180 = 75.687$
$\alpha 1 + \beta 1 - \gamma 1 - \delta 1 = 17.925$
$\alpha 1 + \gamma 1 - \beta 1 - \delta 1 = -80.575$
$\alpha 1 + \delta 1 - \beta 1 - \gamma 1 = -47.012$

Vertex 2
$\alpha 2 - \beta 2 = -86.415$
$\alpha 2 - \gamma 2 = -45.531$
$\alpha 2 - \delta 2 = -15.750$
$\beta 2 - \gamma 2 = 40.884$
$\beta 2 - \delta 2 = 70.665$
$\gamma 2 - \delta 2 = 29.781$
$\alpha 2 + \beta 2 - 180 = 34.914$
$\gamma 2 + \delta 2 - 180 = 9.781$
$\alpha 2 + \gamma 2 - 180 = -5.970$
$\beta 2 + \delta 2 - 180 = 50.665$
$\alpha 2 + \delta 2 - 180 = -35.750$
$\beta 2 + \gamma 2 - 180 = 80.445$
$\alpha 2 + \beta 2 - \gamma 2 - \delta 2 = 25.133$
$\alpha 2 + \gamma 2 - \beta 2 - \delta 2 = -56.634$

$\alpha2 + \delta2 - \beta2 - \gamma2 = -116.200$

Vertex 3
$\alpha3 - \beta3 = -82.474$
$\alpha3 - \gamma3 = -58.426$
$\alpha3 - \delta3 = -53.808$
$\beta3 - \gamma3 = 24.049$
$\beta3 - \delta3 = 28.666$
$\gamma3 - \delta3 = 4.618$
$\alpha3 + \beta3 - 180 = -35.142$
$\gamma3 + \delta3 - 180 = -5.382$
$\alpha3 + \gamma3 - 180 = -59.190$
$\beta3 + \delta3 - 180 = 18.666$
$\alpha3 + \delta3 - 180 = -63.808$
$\beta3 + \gamma3 - 180 = 23.284$
$\alpha3 + \beta3 - \gamma3 - \delta3 = -29.759$
$\alpha3 + \gamma3 - \beta3 - \delta3 = -77.857$
$\alpha3 + \delta3 - \beta3 - \gamma3 = -87.092$

Vertex 4
$\alpha4 - \beta4 = -79.478$
$\alpha4 - \gamma4 = -93.561$
$\alpha4 - \delta4 = -46.804$
$\beta4 - \gamma4 = -14.083$
$\beta4 - \delta4 = 32.674$
$\gamma4 - \delta4 = 46.757$
$\alpha4 + \beta4 - 180 = -44.131$
$\gamma4 + \delta4 - 180 = 16.757$
$\alpha4 + \gamma4 - 180 = -30.048$
$\beta4 + \delta4 - 180 = 2.674$
$\alpha4 + \delta4 - 180 = -76.804$
$\beta4 + \gamma4 - 180 = 49.430$
$\alpha4 + \beta4 - \gamma4 - \delta4 = -60.887$
$\alpha4 + \gamma4 - \beta4 - \delta4 = -32.722$
$\alpha4 + \delta4 - \beta4 - \gamma4 = -126.230$

Switch combination: Upper

Switched anglesDeg:

$$\begin{pmatrix} 91.3249 & 27.5312 & 103.218 & 120 \\ 115.75 & 29.3354 & 109.781 & 80 \\ 148.808 & 66.3336 & 89.6176 & 85 \\ 151.804 & 72.3261 & 121.757 & 75 \end{pmatrix}$$

Angle relation checks for i = 1..4:

Vertex 1
$\alpha1 - \beta1 = 63.794$
$\alpha1 - \gamma1 = -11.894$
$\alpha1 - \delta1 = -28.675$
$\beta1 - \gamma1 = -75.687$
$\beta1 - \delta1 = -92.469$
$\gamma1 - \delta1 = -16.782$
$\alpha1 + \beta1 - 180 = -61.144$
$\gamma1 + \delta1 - 180 = 43.218$
$\alpha1 + \gamma1 - 180 = 14.543$
$\beta1 + \delta1 - 180 = -32.469$
$\alpha1 + \delta1 - 180 = 31.325$
$\beta1 + \gamma1 - 180 = -49.250$
$\alpha1 + \beta1 - \gamma1 - \delta1 = -104.360$
$\alpha1 + \gamma1 - \beta1 - \delta1 = 47.012$
$\alpha1 + \delta1 - \beta1 - \gamma1 = 80.575$

Vertex 2
$\alpha 2 - \beta 2 = 86.415$
$\alpha 2 - \gamma 2 = 5.970$
$\alpha 2 - \delta 2 = 35.750$
$\beta 2 - \gamma 2 = -80.445$
$\beta 2 - \delta 2 = -50.665$
$\gamma 2 - \delta 2 = 29.781$
$\alpha 2 + \beta 2 - 180 = -34.914$
$\gamma 2 + \delta 2 - 180 = 9.781$
$\alpha 2 + \gamma 2 - 180 = 45.531$
$\beta 2 + \delta 2 - 180 = -70.665$
$\alpha 2 + \delta 2 - 180 = 15.750$
$\beta 2 + \gamma 2 - 180 = -40.884$
$\alpha 2 + \beta 2 - \gamma 2 - \delta 2 = -44.695$
$\alpha 2 + \gamma 2 - \beta 2 - \delta 2 = 116.200$
$\alpha 2 + \delta 2 - \beta 2 - \gamma 2 = 56.634$

Vertex 3
$\alpha 3 - \beta 3 = 82.474$
$\alpha 3 - \gamma 3 = 59.190$
$\alpha 3 - \delta 3 = 63.808$
$\beta 3 - \gamma 3 = -23.284$
$\beta 3 - \delta 3 = -18.666$
$\gamma 3 - \delta 3 = 4.618$
$\alpha 3 + \beta 3 - 180 = 35.142$
$\gamma 3 + \delta 3 - 180 = -5.382$
$\alpha 3 + \gamma 3 - 180 = 58.426$
$\beta 3 + \delta 3 - 180 = -28.666$
$\alpha 3 + \delta 3 - 180 = 53.808$
$\beta 3 + \gamma 3 - 180 = -24.049$
$\alpha 3 + \beta 3 - \gamma 3 - \delta 3 = 40.524$
$\alpha 3 + \gamma 3 - \beta 3 - \delta 3 = 87.092$
$\alpha 3 + \delta 3 - \beta 3 - \gamma 3 = 77.857$

Vertex 4
$\alpha 4 - \beta 4 = 79.478$
$\alpha 4 - \gamma 4 = 30.048$
$\alpha 4 - \delta 4 = 76.804$
$\beta 4 - \gamma 4 = -49.430$
$\beta 4 - \delta 4 = -2.674$
$\gamma 4 - \delta 4 = 46.757$
$\alpha 4 + \beta 4 - 180 = 44.131$
$\gamma 4 + \delta 4 - 180 = 16.757$
$\alpha 4 + \gamma 4 - 180 = 93.561$
$\beta 4 + \delta 4 - 180 = -32.674$
$\alpha 4 + \delta 4 - 180 = 46.804$
$\beta 4 + \gamma 4 - 180 = 14.083$
$\alpha 4 + \beta 4 - \gamma 4 - \delta 4 = 27.374$
$\alpha 4 + \gamma 4 - \beta 4 - \delta 4 = 126.230$
$\alpha 4 + \delta 4 - \beta 4 - \gamma 4 = 32.722$

Switch combination: Right + Left

Switched anglesDeg:

$$\begin{pmatrix} 91.3249 & 152.469 & 76.7816 & 120 \\ 115.75 & 150.665 & 70.2192 & 80 \\ 31.192 & 66.3336 & 90.3824 & 85 \\ 28.1955 & 72.3261 & 58.2435 & 75 \end{pmatrix}$$

Angle relation checks for i = 1..4:

Vertex 1

$\alpha 1 - \beta 1 = -61.144$
$\alpha 1 - \gamma 1 = 14.543$
$\alpha 1 - \delta 1 = -28.675$
$\beta 1 - \gamma 1 = 75.687$
$\beta 1 - \delta 1 = 32.469$
$\gamma 1 - \delta 1 = -43.218$
$\alpha 1 + \beta 1 - 180 = 63.794$
$\gamma 1 + \delta 1 - 180 = 16.782$
$\alpha 1 + \gamma 1 - 180 = -11.894$
$\beta 1 + \delta 1 - 180 = 92.469$
$\alpha 1 + \delta 1 - 180 = 31.325$
$\beta 1 + \gamma 1 - 180 = 49.250$
$\alpha 1 + \beta 1 - \gamma 1 - \delta 1 = 47.012$
$\alpha 1 + \gamma 1 - \beta 1 - \delta 1 = -104.360$
$\alpha 1 + \delta 1 - \beta 1 - \gamma 1 = -17.925$

Vertex 2

$\alpha 2 - \beta 2 = -34.914$
$\alpha 2 - \gamma 2 = 45.531$
$\alpha 2 - \delta 2 = 35.750$
$\beta 2 - \gamma 2 = 80.445$
$\beta 2 - \delta 2 = 70.665$
$\gamma 2 - \delta 2 = -9.781$
$\alpha 2 + \beta 2 - 180 = 86.415$
$\gamma 2 + \delta 2 - 180 = -29.781$
$\alpha 2 + \gamma 2 - 180 = 5.970$
$\beta 2 + \delta 2 - 180 = 50.665$
$\alpha 2 + \delta 2 - 180 = 15.750$
$\beta 2 + \gamma 2 - 180 = 40.884$
$\alpha 2 + \beta 2 - \gamma 2 - \delta 2 = 116.200$
$\alpha 2 + \gamma 2 - \beta 2 - \delta 2 = -44.695$
$\alpha 2 + \delta 2 - \beta 2 - \gamma 2 = -25.133$

Vertex 3

$\alpha 3 - \beta 3 = -35.142$
$\alpha 3 - \gamma 3 = -59.190$
$\alpha 3 - \delta 3 = -53.808$
$\beta 3 - \gamma 3 = -24.049$
$\beta 3 - \delta 3 = -18.666$
$\gamma 3 - \delta 3 = 5.382$
$\alpha 3 + \beta 3 - 180 = -82.474$
$\gamma 3 + \delta 3 - 180 = -4.618$
$\alpha 3 + \gamma 3 - 180 = -58.426$
$\beta 3 + \delta 3 - 180 = -28.666$
$\alpha 3 + \delta 3 - 180 = -63.808$
$\beta 3 + \gamma 3 - 180 = -23.284$
$\alpha 3 + \beta 3 - \gamma 3 - \delta 3 = -77.857$
$\alpha 3 + \gamma 3 - \beta 3 - \delta 3 = -29.759$
$\alpha 3 + \delta 3 - \beta 3 - \gamma 3 = -40.524$

Vertex 4

$\alpha 4 - \beta 4 = -44.131$
$\alpha 4 - \gamma 4 = -30.048$
$\alpha 4 - \delta 4 = -46.804$
$\beta 4 - \gamma 4 = 14.083$
$\beta 4 - \delta 4 = -2.674$
$\gamma 4 - \delta 4 = -16.757$
$\alpha 4 + \beta 4 - 180 = -79.478$
$\gamma 4 + \delta 4 - 180 = -46.757$
$\alpha 4 + \gamma 4 - 180 = -93.561$
$\beta 4 + \delta 4 - 180 = -32.674$

$\beta 4 + \delta 4 - 180 = -32.674$

$\alpha 4 + \delta 4 - 180 = -76.804$

$\beta 4 + \gamma 4 - 180 = -49.430$

$\alpha 4 + \beta 4 - \gamma 4 - \delta 4 = -32.722$

$\alpha 4 + \gamma 4 - \beta 4 - \delta 4 = -60.887$

$\alpha 4 + \delta 4 - \beta 4 - \gamma 4 = -27.374$

Switch combination: Right + Lower

Switched anglesDeg:

$$\begin{pmatrix} 88.6751 & 27.5312 & 76.7816 & 120 \\ 64.2495 & 150.665 & 109.781 & 80 \\ 31.192 & 113.666 & 89.6176 & 85 \\ 28.1955 & 72.3261 & 58.2435 & 75 \end{pmatrix}$$

Angle relation checks for i = 1..4:

Vertex 1

$\alpha 1 - \beta 1 = 61.144$

$\alpha 1 - \gamma 1 = 11.894$

$\alpha 1 - \delta 1 = -31.325$

$\beta 1 - \gamma 1 = -49.250$

$\beta 1 - \delta 1 = -92.469$

$\gamma 1 - \delta 1 = -43.218$

$\alpha 1 + \beta 1 - 180 = -63.794$

$\gamma 1 + \delta 1 - 180 = 16.782$

$\alpha 1 + \gamma 1 - 180 = -14.543$

$\beta 1 + \delta 1 - 180 = -32.469$

$\alpha 1 + \delta 1 - 180 = 28.675$

$\beta 1 + \gamma 1 - 180 = -75.687$

$\alpha 1 + \beta 1 - \gamma 1 - \delta 1 = -80.575$

$\alpha 1 + \gamma 1 - \beta 1 - \delta 1 = 17.925$

$\alpha 1 + \delta 1 - \beta 1 - \gamma 1 = 104.360$

Vertex 2

$\alpha 2 - \beta 2 = -86.415$

$\alpha 2 - \gamma 2 = -45.531$

$\alpha 2 - \delta 2 = -15.750$

$\beta 2 - \gamma 2 = 40.884$

$\beta 2 - \delta 2 = 70.665$

$\gamma 2 - \delta 2 = 29.781$

$\alpha 2 + \beta 2 - 180 = 34.914$

$\gamma 2 + \delta 2 - 180 = 9.781$

$\alpha 2 + \gamma 2 - 180 = -5.970$

$\beta 2 + \delta 2 - 180 = 50.665$

$\alpha 2 + \delta 2 - 180 = -35.750$

$\beta 2 + \gamma 2 - 180 = 80.445$

$\alpha 2 + \beta 2 - \gamma 2 - \delta 2 = 25.133$

$\alpha 2 + \gamma 2 - \beta 2 - \delta 2 = -56.634$

$\alpha 2 + \delta 2 - \beta 2 - \gamma 2 = -116.200$

Vertex 3

$\alpha 3 - \beta 3 = -82.474$

$\alpha 3 - \gamma 3 = -58.426$

$\alpha 3 - \delta 3 = -53.808$

$\beta 3 - \gamma 3 = 24.049$

$\beta 3 - \delta 3 = 28.666$

$\gamma 3 - \delta 3 = 4.618$

$\alpha 3 + \beta 3 - 180 = -35.142$

$\gamma 3 + \delta 3 - 180 = -5.382$

$\alpha 3 + \gamma 3 - 180 = -59.190$

$\beta 3 + \delta 3 - 180 = 18.666$

$\alpha 3 + \delta 3 - 180 = -63.808$

$\alpha3 + \delta3 - 180 = -63.808$
$\beta3 + \gamma3 - 180 = 23.284$
$\alpha3 + \beta3 - \gamma3 - \delta3 = -29.759$
$\alpha3 + \gamma3 - \beta3 - \delta3 = -77.857$
$\alpha3 + \delta3 - \beta3 - \gamma3 = -87.092$

Vertex 4
$\alpha4 - \beta4 = -44.131$
$\alpha4 - \gamma4 = -30.048$
$\alpha4 - \delta4 = -46.804$
$\beta4 - \gamma4 = 14.083$
$\beta4 - \delta4 = -2.674$
$\gamma4 - \delta4 = -16.757$
$\alpha4 + \beta4 - 180 = -79.478$
$\gamma4 + \delta4 - 180 = -46.757$
$\alpha4 + \gamma4 - 180 = -93.561$
$\beta4 + \delta4 - 180 = -32.674$
$\alpha4 + \delta4 - 180 = -76.804$
$\beta4 + \gamma4 - 180 = -49.430$
$\alpha4 + \beta4 - \gamma4 - \delta4 = -32.722$
$\alpha4 + \gamma4 - \beta4 - \delta4 = -60.887$
$\alpha4 + \delta4 - \beta4 - \gamma4 = -27.374$

Switch combination: Right + Upper

Switched anglesDeg:

$$\begin{pmatrix} 91.3249 & 152.469 & 76.7816 & 120 \\ 115.75 & 29.3354 & 109.781 & 80 \\ 148.808 & 66.3336 & 89.6176 & 85 \\ 151.804 & 107.674 & 58.2435 & 75 \end{pmatrix}$$

Angle relation checks for i = 1..4:

Vertex 1
$\alpha1 - \beta1 = -61.144$
$\alpha1 - \gamma1 = 14.543$
$\alpha1 - \delta1 = -28.675$
$\beta1 - \gamma1 = 75.687$
$\beta1 - \delta1 = 32.469$
$\gamma1 - \delta1 = -43.218$
$\alpha1 + \beta1 - 180 = 63.794$
$\gamma1 + \delta1 - 180 = 16.782$
$\alpha1 + \gamma1 - 180 = -11.894$
$\beta1 + \delta1 - 180 = 92.469$
$\alpha1 + \delta1 - 180 = 31.325$
$\beta1 + \gamma1 - 180 = 49.250$
$\alpha1 + \beta1 - \gamma1 - \delta1 = 47.012$
$\alpha1 + \gamma1 - \beta1 - \delta1 = -104.360$
$\alpha1 + \delta1 - \beta1 - \gamma1 = -17.925$

Vertex 2
$\alpha2 - \beta2 = 86.415$
$\alpha2 - \gamma2 = 5.970$
$\alpha2 - \delta2 = 35.750$
$\beta2 - \gamma2 = -80.445$
$\beta2 - \delta2 = -50.665$
$\gamma2 - \delta2 = 29.781$
$\alpha2 + \beta2 - 180 = -34.914$
$\gamma2 + \delta2 - 180 = 9.781$
$\alpha2 + \gamma2 - 180 = 45.531$
$\beta2 + \delta2 - 180 = -70.665$
$\alpha2 + \delta2 - 180 = 15.750$

$\beta 2 + \gamma 2 - 180 = -40.884$
$\alpha 2 + \beta 2 - \gamma 2 - \delta 2 = -44.695$
$\alpha 2 + \gamma 2 - \beta 2 - \delta 2 = 116.200$
$\alpha 2 + \delta 2 - \beta 2 - \gamma 2 = 56.634$

Vertex 3
$\alpha 3 - \beta 3 = 82.474$
$\alpha 3 - \gamma 3 = 59.190$
$\alpha 3 - \delta 3 = 63.808$
$\beta 3 - \gamma 3 = -23.284$
$\beta 3 - \delta 3 = -18.666$
$\gamma 3 - \delta 3 = 4.618$
$\alpha 3 + \beta 3 - 180 = 35.142$
$\gamma 3 + \delta 3 - 180 = -5.382$
$\alpha 3 + \gamma 3 - 180 = 58.426$
$\beta 3 + \delta 3 - 180 = -28.666$
$\alpha 3 + \delta 3 - 180 = 53.808$
$\beta 3 + \gamma 3 - 180 = -24.049$
$\alpha 3 + \beta 3 - \gamma 3 - \delta 3 = 40.524$
$\alpha 3 + \gamma 3 - \beta 3 - \delta 3 = 87.092$
$\alpha 3 + \delta 3 - \beta 3 - \gamma 3 = 77.857$

Vertex 4
$\alpha 4 - \beta 4 = 44.131$
$\alpha 4 - \gamma 4 = 93.561$
$\alpha 4 - \delta 4 = 76.804$
$\beta 4 - \gamma 4 = 49.430$
$\beta 4 - \delta 4 = 32.674$
$\gamma 4 - \delta 4 = -16.757$
$\alpha 4 + \beta 4 - 180 = 79.478$
$\gamma 4 + \delta 4 - 180 = -46.757$
$\alpha 4 + \gamma 4 - 180 = 30.048$
$\beta 4 + \delta 4 - 180 = 2.674$
$\alpha 4 + \delta 4 - 180 = 46.804$
$\beta 4 + \gamma 4 - 180 = -14.083$
$\alpha 4 + \beta 4 - \gamma 4 - \delta 4 = 126.230$
$\alpha 4 + \gamma 4 - \beta 4 - \delta 4 = 27.374$
$\alpha 4 + \delta 4 - \beta 4 - \gamma 4 = 60.887$

Switch combination: Left + Lower

Switched anglesDeg:

$$\begin{pmatrix} 88.6751 & 152.469 & 103.218 & 120 \\ 64.2495 & 29.3354 & 70.2192 & 80 \\ 31.192 & 66.3336 & 90.3824 & 85 \\ 28.1955 & 107.674 & 121.757 & 75 \end{pmatrix}$$

Angle relation checks for i = 1..4:

Vertex 1
$\alpha 1 - \beta 1 = -63.794$
$\alpha 1 - \gamma 1 = -14.543$
$\alpha 1 - \delta 1 = -31.325$
$\beta 1 - \gamma 1 = 49.250$
$\beta 1 - \delta 1 = 32.469$
$\gamma 1 - \delta 1 = -16.782$
$\alpha 1 + \beta 1 - 180 = 61.144$
$\gamma 1 + \delta 1 - 180 = 43.218$
$\alpha 1 + \gamma 1 - 180 = 11.894$
$\beta 1 + \delta 1 - 180 = 92.469$
$\alpha 1 + \delta 1 - 180 = 28.675$
$\beta 1 + \gamma 1 - 180 = 75.687$

$\alpha1 + \beta1 - \gamma1 - \delta1 = 17.925$
$\alpha1 + \gamma1 - \beta1 - \delta1 = -80.575$
$\alpha1 + \delta1 - \beta1 - \gamma1 = -47.012$

Vertex 2
$\alpha2 - \beta2 = 34.914$
$\alpha2 - \gamma2 = -5.970$
$\alpha2 - \delta2 = -15.750$
$\beta2 - \gamma2 = -40.884$
$\beta2 - \delta2 = -50.665$
$\gamma2 - \delta2 = -9.781$
$\alpha2 + \beta2 - 180 = -86.415$
$\gamma2 + \delta2 - 180 = -29.781$
$\alpha2 + \gamma2 - 180 = -45.531$
$\beta2 + \delta2 - 180 = -70.665$
$\alpha2 + \delta2 - 180 = -35.750$
$\beta2 + \gamma2 - 180 = -80.445$
$\alpha2 + \beta2 - \gamma2 - \delta2 = -56.634$
$\alpha2 + \gamma2 - \beta2 - \delta2 = 25.133$
$\alpha2 + \delta2 - \beta2 - \gamma2 = 44.695$

Vertex 3
$\alpha3 - \beta3 = -35.142$
$\alpha3 - \gamma3 = -59.190$
$\alpha3 - \delta3 = -53.808$
$\beta3 - \gamma3 = -24.049$
$\beta3 - \delta3 = -18.666$
$\gamma3 - \delta3 = 5.382$
$\alpha3 + \beta3 - 180 = -82.474$
$\gamma3 + \delta3 - 180 = -4.618$
$\alpha3 + \gamma3 - 180 = -58.426$
$\beta3 + \delta3 - 180 = -28.666$
$\alpha3 + \delta3 - 180 = -63.808$
$\beta3 + \gamma3 - 180 = -23.284$
$\alpha3 + \beta3 - \gamma3 - \delta3 = -77.857$
$\alpha3 + \gamma3 - \beta3 - \delta3 = -29.759$
$\alpha3 + \delta3 - \beta3 - \gamma3 = -40.524$

Vertex 4
$\alpha4 - \beta4 = -79.478$
$\alpha4 - \gamma4 = -93.561$
$\alpha4 - \delta4 = -46.804$
$\beta4 - \gamma4 = -14.083$
$\beta4 - \delta4 = 32.674$
$\gamma4 - \delta4 = 46.757$
$\alpha4 + \beta4 - 180 = -44.131$
$\gamma4 + \delta4 - 180 = 16.757$
$\alpha4 + \gamma4 - 180 = -30.048$
$\beta4 + \delta4 - 180 = 2.674$
$\alpha4 + \delta4 - 180 = -76.804$
$\beta4 + \gamma4 - 180 = 49.430$
$\alpha4 + \beta4 - \gamma4 - \delta4 = -60.887$
$\alpha4 + \gamma4 - \beta4 - \delta4 = -32.722$
$\alpha4 + \delta4 - \beta4 - \gamma4 = -126.230$

Switch combination: Left + Upper

Switched anglesDeg:

$$\begin{pmatrix} 91.3249 & 27.5312 & 103.218 & 120 \\ 115.75 & 150.665 & 70.2192 & 80 \\ 148.808 & 113.666 & 90.3824 & 85 \\ 151.804 & 72.3261 & 121.757 & 75 \end{pmatrix}$$

Angle relation checks for i = 1..4:

Vertex 1

$\alpha 1 - \beta 1 = 63.794$
$\alpha 1 - \gamma 1 = -11.894$
$\alpha 1 - \delta 1 = -28.675$
$\beta 1 - \gamma 1 = -75.687$
$\beta 1 - \delta 1 = -92.469$
$\gamma 1 - \delta 1 = -16.782$
$\alpha 1 + \beta 1 - 180 = -61.144$
$\gamma 1 + \delta 1 - 180 = 43.218$
$\alpha 1 + \gamma 1 - 180 = 14.543$
$\beta 1 + \delta 1 - 180 = -32.469$
$\alpha 1 + \delta 1 - 180 = 31.325$
$\beta 1 + \gamma 1 - 180 = -49.250$
$\alpha 1 + \beta 1 - \gamma 1 - \delta 1 = -104.360$
$\alpha 1 + \gamma 1 - \beta 1 - \delta 1 = 47.012$
$\alpha 1 + \delta 1 - \beta 1 - \gamma 1 = 80.575$

Vertex 2

$\alpha 2 - \beta 2 = -34.914$
$\alpha 2 - \gamma 2 = 45.531$
$\alpha 2 - \delta 2 = 35.750$
$\beta 2 - \gamma 2 = 80.445$
$\beta 2 - \delta 2 = 70.665$
$\gamma 2 - \delta 2 = -9.781$
$\alpha 2 + \beta 2 - 180 = 86.415$
$\gamma 2 + \delta 2 - 180 = -29.781$
$\alpha 2 + \gamma 2 - 180 = 5.970$
$\beta 2 + \delta 2 - 180 = 50.665$
$\alpha 2 + \delta 2 - 180 = 15.750$
$\beta 2 + \gamma 2 - 180 = 40.884$
$\alpha 2 + \beta 2 - \gamma 2 - \delta 2 = 116.200$
$\alpha 2 + \gamma 2 - \beta 2 - \delta 2 = -44.695$
$\alpha 2 + \delta 2 - \beta 2 - \gamma 2 = -25.133$

Vertex 3

$\alpha 3 - \beta 3 = 35.142$
$\alpha 3 - \gamma 3 = 58.426$
$\alpha 3 - \delta 3 = 63.808$
$\beta 3 - \gamma 3 = 23.284$
$\beta 3 - \delta 3 = 28.666$
$\gamma 3 - \delta 3 = 5.382$
$\alpha 3 + \beta 3 - 180 = 82.474$
$\gamma 3 + \delta 3 - 180 = -4.618$
$\alpha 3 + \gamma 3 - 180 = 59.190$
$\beta 3 + \delta 3 - 180 = 18.666$
$\alpha 3 + \delta 3 - 180 = 53.808$
$\beta 3 + \gamma 3 - 180 = 24.049$
$\alpha 3 + \beta 3 - \gamma 3 - \delta 3 = 87.092$
$\alpha 3 + \gamma 3 - \beta 3 - \delta 3 = 40.524$
$\alpha 3 + \delta 3 - \beta 3 - \gamma 3 = 29.759$

Vertex 4

$\alpha 4 - \beta 4 = 79.478$
$\alpha 4 - \gamma 4 = 30.048$
$\alpha 4 - \delta 4 = 76.804$
$\beta 4 - \gamma 4 = -49.430$

$\beta4 - \gamma4 = -49.430$
$\beta4 - \delta4 = -2.674$
$\gamma4 - \delta4 = 46.757$
$\alpha4 + \beta4 - 180 = 44.131$
$\gamma4 + \delta4 - 180 = 16.757$
$\alpha4 + \gamma4 - 180 = 93.561$
$\beta4 + \delta4 - 180 = -32.674$
$\alpha4 + \delta4 - 180 = 46.804$
$\beta4 + \gamma4 - 180 = 14.083$
$\alpha4 + \beta4 - \gamma4 - \delta4 = 27.374$
$\alpha4 + \gamma4 - \beta4 - \delta4 = 126.230$
$\alpha4 + \delta4 - \beta4 - \gamma4 = 32.722$

Switch combination: Lower + Upper

Switched anglesDeg:

$$\begin{pmatrix} 88.6751 & 152.469 & 103.218 & 120 \\ 64.2495 & 150.665 & 109.781 & 80 \\ 148.808 & 66.3336 & 89.6176 & 85 \\ 151.804 & 72.3261 & 121.757 & 75 \end{pmatrix}$$

Angle relation checks for i = 1..4:

Vertex 1
$\alpha1 - \beta1 = -63.794$
$\alpha1 - \gamma1 = -14.543$
$\alpha1 - \delta1 = -31.325$
$\beta1 - \gamma1 = 49.250$
$\beta1 - \delta1 = 32.469$
$\gamma1 - \delta1 = -16.782$
$\alpha1 + \beta1 - 180 = 61.144$
$\gamma1 + \delta1 - 180 = 43.218$
$\alpha1 + \gamma1 - 180 = 11.894$
$\beta1 + \delta1 - 180 = 92.469$
$\alpha1 + \delta1 - 180 = 28.675$
$\beta1 + \gamma1 - 180 = 75.687$
$\alpha1 + \beta1 - \gamma1 - \delta1 = 17.925$
$\alpha1 + \gamma1 - \beta1 - \delta1 = -80.575$
$\alpha1 + \delta1 - \beta1 - \gamma1 = -47.012$

Vertex 2
$\alpha2 - \beta2 = -86.415$
$\alpha2 - \gamma2 = -45.531$
$\alpha2 - \delta2 = -15.750$
$\beta2 - \gamma2 = 40.884$
$\beta2 - \delta2 = 70.665$
$\gamma2 - \delta2 = 29.781$
$\alpha2 + \beta2 - 180 = 34.914$
$\gamma2 + \delta2 - 180 = 9.781$
$\alpha2 + \gamma2 - 180 = -5.970$
$\beta2 + \delta2 - 180 = 50.665$
$\alpha2 + \delta2 - 180 = -35.750$
$\beta2 + \gamma2 - 180 = 80.445$
$\alpha2 + \beta2 - \gamma2 - \delta2 = 25.133$
$\alpha2 + \gamma2 - \beta2 - \delta2 = -56.634$
$\alpha2 + \delta2 - \beta2 - \gamma2 = -116.200$

Vertex 3
$\alpha3 - \beta3 = 82.474$
$\alpha3 - \gamma3 = 59.190$
$\alpha3 - \delta3 = 63.808$
$\beta3 - \gamma3 = -23.284$
$\beta3 - \delta3 = -18.666$

$\beta3 - \delta3 = -18.666$
$\gamma3 - \delta3 = 4.618$
$\alpha3 + \beta3 - 180 = 35.142$
$\gamma3 + \delta3 - 180 = -5.382$
$\alpha3 + \gamma3 - 180 = 58.426$
$\beta3 + \delta3 - 180 = -28.666$
$\alpha3 + \delta3 - 180 = 53.808$
$\beta3 + \gamma3 - 180 = -24.049$
$\alpha3 + \beta3 - \gamma3 - \delta3 = 40.524$
$\alpha3 + \gamma3 - \beta3 - \delta3 = 87.092$
$\alpha3 + \delta3 - \beta3 - \gamma3 = 77.857$

Vertex 4
$\alpha4 - \beta4 = 79.478$
$\alpha4 - \gamma4 = 30.048$
$\alpha4 - \delta4 = 76.804$
$\beta4 - \gamma4 = -49.430$
$\beta4 - \delta4 = -2.674$
$\gamma4 - \delta4 = 46.757$
$\alpha4 + \beta4 - 180 = 44.131$
$\gamma4 + \delta4 - 180 = 16.757$
$\alpha4 + \gamma4 - 180 = 93.561$
$\beta4 + \delta4 - 180 = -32.674$
$\alpha4 + \delta4 - 180 = 46.804$
$\beta4 + \gamma4 - 180 = 14.083$
$\alpha4 + \beta4 - \gamma4 - \delta4 = 27.374$
$\alpha4 + \gamma4 - \beta4 - \delta4 = 126.230$
$\alpha4 + \delta4 - \beta4 - \gamma4 = 32.722$

Switch combination: Right + Left + Lower

Switched anglesDeg:

$$\begin{pmatrix} 88.6751 & 27.5312 & 76.7816 & 120 \\ 64.2495 & 29.3354 & 70.2192 & 80 \\ 31.192 & 66.3336 & 90.3824 & 85 \\ 28.1955 & 72.3261 & 58.2435 & 75 \end{pmatrix}$$

Angle relation checks for i = 1..4:

Vertex 1
$\alpha1 - \beta1 = 61.144$
$\alpha1 - \gamma1 = 11.894$
$\alpha1 - \delta1 = -31.325$
$\beta1 - \gamma1 = -49.250$
$\beta1 - \delta1 = -92.469$
$\gamma1 - \delta1 = -43.218$
$\alpha1 + \beta1 - 180 = -63.794$
$\gamma1 + \delta1 - 180 = 16.782$
$\alpha1 + \gamma1 - 180 = -14.543$
$\beta1 + \delta1 - 180 = -32.469$
$\alpha1 + \delta1 - 180 = 28.675$
$\beta1 + \gamma1 - 180 = -75.687$
$\alpha1 + \beta1 - \gamma1 - \delta1 = -80.575$
$\alpha1 + \gamma1 - \beta1 - \delta1 = 17.925$
$\alpha1 + \delta1 - \beta1 - \gamma1 = 104.360$

Vertex 2
$\alpha2 - \beta2 = 34.914$
$\alpha2 - \gamma2 = -5.970$
$\alpha2 - \delta2 = -15.750$
$\beta2 - \gamma2 = -40.884$
$\beta2 - \delta2 = -50.665$
$\gamma2 - \delta2 = -9.781$

$\gamma 2 - \delta 2 = -9.781$
$\alpha 2 + \beta 2 - 180 = -86.415$
$\gamma 2 + \delta 2 - 180 = -29.781$
$\alpha 2 + \gamma 2 - 180 = -45.531$
$\beta 2 + \delta 2 - 180 = -70.665$
$\alpha 2 + \delta 2 - 180 = -35.750$
$\beta 2 + \gamma 2 - 180 = -80.445$
$\alpha 2 + \beta 2 - \gamma 2 - \delta 2 = -56.634$
$\alpha 2 + \gamma 2 - \beta 2 - \delta 2 = 25.133$
$\alpha 2 + \delta 2 - \beta 2 - \gamma 2 = 44.695$

Vertex 3
$\alpha 3 - \beta 3 = -35.142$
$\alpha 3 - \gamma 3 = -59.190$
$\alpha 3 - \delta 3 = -53.808$
$\beta 3 - \gamma 3 = -24.049$
$\beta 3 - \delta 3 = -18.666$
$\gamma 3 - \delta 3 = 5.382$
$\alpha 3 + \beta 3 - 180 = -82.474$
$\gamma 3 + \delta 3 - 180 = -4.618$
$\alpha 3 + \gamma 3 - 180 = -58.426$
$\beta 3 + \delta 3 - 180 = -28.666$
$\alpha 3 + \delta 3 - 180 = -63.808$
$\beta 3 + \gamma 3 - 180 = -23.284$
$\alpha 3 + \beta 3 - \gamma 3 - \delta 3 = -77.857$
$\alpha 3 + \gamma 3 - \beta 3 - \delta 3 = -29.759$
$\alpha 3 + \delta 3 - \beta 3 - \gamma 3 = -40.524$

Vertex 4
$\alpha 4 - \beta 4 = -44.131$
$\alpha 4 - \gamma 4 = -30.048$
$\alpha 4 - \delta 4 = -46.804$
$\beta 4 - \gamma 4 = 14.083$
$\beta 4 - \delta 4 = -2.674$
$\gamma 4 - \delta 4 = -16.757$
$\alpha 4 + \beta 4 - 180 = -79.478$
$\gamma 4 + \delta 4 - 180 = -46.757$
$\alpha 4 + \gamma 4 - 180 = -93.561$
$\beta 4 + \delta 4 - 180 = -32.674$
$\alpha 4 + \delta 4 - 180 = -76.804$
$\beta 4 + \gamma 4 - 180 = -49.430$
$\alpha 4 + \beta 4 - \gamma 4 - \delta 4 = -32.722$
$\alpha 4 + \gamma 4 - \beta 4 - \delta 4 = -60.887$
$\alpha 4 + \delta 4 - \beta 4 - \gamma 4 = -27.374$

Switch combination: Right + Left + Upper

Switched anglesDeg:

$$\begin{pmatrix} 91.3249 & 152.469 & 76.7816 & 120 \\ 115.75 & 150.665 & 70.2192 & 80 \\ 148.808 & 113.666 & 90.3824 & 85 \\ 151.804 & 107.674 & 58.2435 & 75 \end{pmatrix}$$

Angle relation checks for i = 1..4:

Vertex 1
$\alpha 1 - \beta 1 = -61.144$
$\alpha 1 - \gamma 1 = 14.543$
$\alpha 1 - \delta 1 = -28.675$
$\beta 1 - \gamma 1 = 75.687$
$\beta 1 - \delta 1 = 32.469$
$\gamma 1 - \delta 1 = -43.218$

$\alpha1 + \beta1 - 180 = 63.794$
$\gamma1 + \delta1 - 180 = 16.782$
$\alpha1 + \gamma1 - 180 = -11.894$
$\beta1 + \delta1 - 180 = 92.469$
$\alpha1 + \delta1 - 180 = 31.325$
$\beta1 + \gamma1 - 180 = 49.250$
$\alpha1 + \beta1 - \gamma1 - \delta1 = 47.012$
$\alpha1 + \gamma1 - \beta1 - \delta1 = -104.360$
$\alpha1 + \delta1 - \beta1 - \gamma1 = -17.925$

Vertex 2
$\alpha2 - \beta2 = -34.914$
$\alpha2 - \gamma2 = 45.531$
$\alpha2 - \delta2 = 35.750$
$\beta2 - \gamma2 = 80.445$
$\beta2 - \delta2 = 70.665$
$\gamma2 - \delta2 = -9.781$
$\alpha2 + \beta2 - 180 = 86.415$
$\gamma2 + \delta2 - 180 = -29.781$
$\alpha2 + \gamma2 - 180 = 5.970$
$\beta2 + \delta2 - 180 = 50.665$
$\alpha2 + \delta2 - 180 = 15.750$
$\beta2 + \gamma2 - 180 = 40.884$
$\alpha2 + \beta2 - \gamma2 - \delta2 = 116.200$
$\alpha2 + \gamma2 - \beta2 - \delta2 = -44.695$
$\alpha2 + \delta2 - \beta2 - \gamma2 = -25.133$

Vertex 3
$\alpha3 - \beta3 = 35.142$
$\alpha3 - \gamma3 = 58.426$
$\alpha3 - \delta3 = 63.808$
$\beta3 - \gamma3 = 23.284$
$\beta3 - \delta3 = 28.666$
$\gamma3 - \delta3 = 5.382$
$\alpha3 + \beta3 - 180 = 82.474$
$\gamma3 + \delta3 - 180 = -4.618$
$\alpha3 + \gamma3 - 180 = 59.190$
$\beta3 + \delta3 - 180 = 18.666$
$\alpha3 + \delta3 - 180 = 53.808$
$\beta3 + \gamma3 - 180 = 24.049$
$\alpha3 + \beta3 - \gamma3 - \delta3 = 87.092$
$\alpha3 + \gamma3 - \beta3 - \delta3 = 40.524$
$\alpha3 + \delta3 - \beta3 - \gamma3 = 29.759$

Vertex 4
$\alpha4 - \beta4 = 44.131$
$\alpha4 - \gamma4 = 93.561$
$\alpha4 - \delta4 = 76.804$
$\beta4 - \gamma4 = 49.430$
$\beta4 - \delta4 = 32.674$
$\gamma4 - \delta4 = -16.757$
$\alpha4 + \beta4 - 180 = 79.478$
$\gamma4 + \delta4 - 180 = -46.757$
$\alpha4 + \gamma4 - 180 = 30.048$
$\beta4 + \delta4 - 180 = 2.674$
$\alpha4 + \delta4 - 180 = 46.804$
$\beta4 + \gamma4 - 180 = -14.083$
$\alpha4 + \beta4 - \gamma4 - \delta4 = 126.230$
$\alpha4 + \gamma4 - \beta4 - \delta4 = 27.374$
$\alpha4 + \delta4 - \beta4 - \gamma4 = 60.887$

Switch combination: Right + Lower + Upper

Switched anglesDeg:

$$\begin{pmatrix} 88.6751 & 27.5312 & 76.7816 & 120 \\ 64.2495 & 150.665 & 109.781 & 80 \\ 148.808 & 66.3336 & 89.6176 & 85 \\ 151.804 & 107.674 & 58.2435 & 75 \end{pmatrix}$$

Angle relation checks for i = 1..4:

Vertex 1

$\alpha 1 - \beta 1 = 61.144$
$\alpha 1 - \gamma 1 = 11.894$
$\alpha 1 - \delta 1 = -31.325$
$\beta 1 - \gamma 1 = -49.250$
$\beta 1 - \delta 1 = -92.469$
$\gamma 1 - \delta 1 = -43.218$
$\alpha 1 + \beta 1 - 180 = -63.794$
$\gamma 1 + \delta 1 - 180 = 16.782$
$\alpha 1 + \gamma 1 - 180 = -14.543$
$\beta 1 + \delta 1 - 180 = -32.469$
$\alpha 1 + \delta 1 - 180 = 28.675$
$\beta 1 + \gamma 1 - 180 = -75.687$
$\alpha 1 + \beta 1 - \gamma 1 - \delta 1 = -80.575$
$\alpha 1 + \gamma 1 - \beta 1 - \delta 1 = 17.925$
$\alpha 1 + \delta 1 - \beta 1 - \gamma 1 = 104.360$

Vertex 2

$\alpha 2 - \beta 2 = -86.415$
$\alpha 2 - \gamma 2 = -45.531$
$\alpha 2 - \delta 2 = -15.750$
$\beta 2 - \gamma 2 = 40.884$
$\beta 2 - \delta 2 = 70.665$
$\gamma 2 - \delta 2 = 29.781$
$\alpha 2 + \beta 2 - 180 = 34.914$
$\gamma 2 + \delta 2 - 180 = 9.781$
$\alpha 2 + \gamma 2 - 180 = -5.970$
$\beta 2 + \delta 2 - 180 = 50.665$
$\alpha 2 + \delta 2 - 180 = -35.750$
$\beta 2 + \gamma 2 - 180 = 80.445$
$\alpha 2 + \beta 2 - \gamma 2 - \delta 2 = 25.133$
$\alpha 2 + \gamma 2 - \beta 2 - \delta 2 = -56.634$
$\alpha 2 + \delta 2 - \beta 2 - \gamma 2 = -116.200$

Vertex 3

$\alpha 3 - \beta 3 = 82.474$
$\alpha 3 - \gamma 3 = 59.190$
$\alpha 3 - \delta 3 = 63.808$
$\beta 3 - \gamma 3 = -23.284$
$\beta 3 - \delta 3 = -18.666$
$\gamma 3 - \delta 3 = 4.618$
$\alpha 3 + \beta 3 - 180 = 35.142$
$\gamma 3 + \delta 3 - 180 = -5.382$
$\alpha 3 + \gamma 3 - 180 = 58.426$
$\beta 3 + \delta 3 - 180 = -28.666$
$\alpha 3 + \delta 3 - 180 = 53.808$
$\beta 3 + \gamma 3 - 180 = -24.049$
$\alpha 3 + \beta 3 - \gamma 3 - \delta 3 = 40.524$
$\alpha 3 + \gamma 3 - \beta 3 - \delta 3 = 87.092$
$\alpha 3 + \delta 3 - \beta 3 - \gamma 3 = 77.857$

Vertex 4
$\alpha4 - \beta4 = 44.131$
$\alpha4 - \gamma4 = 93.561$
$\alpha4 - \delta4 = 76.804$
$\beta4 - \gamma4 = 49.430$
$\beta4 - \delta4 = 32.674$
$\gamma4 - \delta4 = -16.757$
$\alpha4 + \beta4 - 180 = 79.478$
$\gamma4 + \delta4 - 180 = -46.757$
$\alpha4 + \gamma4 - 180 = 30.048$
$\beta4 + \delta4 - 180 = 2.674$
$\alpha4 + \delta4 - 180 = 46.804$
$\beta4 + \gamma4 - 180 = -14.083$
$\alpha4 + \beta4 - \gamma4 - \delta4 = 126.230$
$\alpha4 + \gamma4 - \beta4 - \delta4 = 27.374$
$\alpha4 + \delta4 - \beta4 - \gamma4 = 60.887$

Switch combination: Left + Lower + Upper

Switched anglesDeg:

$$\begin{pmatrix} 88.6751 & 152.469 & 103.218 & 120 \\ 64.2495 & 29.3354 & 70.2192 & 80 \\ 148.808 & 113.666 & 90.3824 & 85 \\ 151.804 & 72.3261 & 121.757 & 75 \end{pmatrix}$$

Angle relation checks for i = 1..4:

Vertex 1
$\alpha1 - \beta1 = -63.794$
$\alpha1 - \gamma1 = -14.543$
$\alpha1 - \delta1 = -31.325$
$\beta1 - \gamma1 = 49.250$
$\beta1 - \delta1 = 32.469$
$\gamma1 - \delta1 = -16.782$
$\alpha1 + \beta1 - 180 = 61.144$
$\gamma1 + \delta1 - 180 = 43.218$
$\alpha1 + \gamma1 - 180 = 11.894$
$\beta1 + \delta1 - 180 = 92.469$
$\alpha1 + \delta1 - 180 = 28.675$
$\beta1 + \gamma1 - 180 = 75.687$
$\alpha1 + \beta1 - \gamma1 - \delta1 = 17.925$
$\alpha1 + \gamma1 - \beta1 - \delta1 = -80.575$
$\alpha1 + \delta1 - \beta1 - \gamma1 = -47.012$

Vertex 2
$\alpha2 - \beta2 = 34.914$
$\alpha2 - \gamma2 = -5.970$
$\alpha2 - \delta2 = -15.750$
$\beta2 - \gamma2 = -40.884$
$\beta2 - \delta2 = -50.665$
$\gamma2 - \delta2 = -9.781$
$\alpha2 + \beta2 - 180 = -86.415$
$\gamma2 + \delta2 - 180 = -29.781$
$\alpha2 + \gamma2 - 180 = -45.531$
$\beta2 + \delta2 - 180 = -70.665$
$\alpha2 + \delta2 - 180 = -35.750$
$\beta2 + \gamma2 - 180 = -80.445$
$\alpha2 + \beta2 - \gamma2 - \delta2 = -56.634$
$\alpha2 + \gamma2 - \beta2 - \delta2 = 25.133$
$\alpha2 + \delta2 - \beta2 - \gamma2 = 44.695$

Vertex 3

$\alpha3 - \beta3 = 35.142$
$\alpha3 - \gamma3 = 58.426$
$\alpha3 - \delta3 = 63.808$
$\beta3 - \gamma3 = 23.284$
$\beta3 - \delta3 = 28.666$
$\gamma3 - \delta3 = 5.382$
$\alpha3 + \beta3 - 180 = 82.474$
$\gamma3 + \delta3 - 180 = -4.618$
$\alpha3 + \gamma3 - 180 = 59.190$
$\beta3 + \delta3 - 180 = 18.666$
$\alpha3 + \delta3 - 180 = 53.808$
$\beta3 + \gamma3 - 180 = 24.049$
$\alpha3 + \beta3 - \gamma3 - \delta3 = 87.092$
$\alpha3 + \gamma3 - \beta3 - \delta3 = 40.524$
$\alpha3 + \delta3 - \beta3 - \gamma3 = 29.759$

Vertex 4
$\alpha4 - \beta4 = 79.478$
$\alpha4 - \gamma4 = 30.048$
$\alpha4 - \delta4 = 76.804$
$\beta4 - \gamma4 = -49.430$
$\beta4 - \delta4 = -2.674$
$\gamma4 - \delta4 = 46.757$
$\alpha4 + \beta4 - 180 = 44.131$
$\gamma4 + \delta4 - 180 = 16.757$
$\alpha4 + \gamma4 - 180 = 93.561$
$\beta4 + \delta4 - 180 = -32.674$
$\alpha4 + \delta4 - 180 = 46.804$
$\beta4 + \gamma4 - 180 = 14.083$
$\alpha4 + \beta4 - \gamma4 - \delta4 = 27.374$
$\alpha4 + \gamma4 - \beta4 - \delta4 = 126.230$
$\alpha4 + \delta4 - \beta4 - \gamma4 = 32.722$

Switch combination: Right + Left + Lower + Upper

Switched anglesDeg:

$$\begin{pmatrix} 88.6751 & 27.5312 & 76.7816 & 120 \\ 64.2495 & 29.3354 & 70.2192 & 80 \\ 148.808 & 113.666 & 90.3824 & 85 \\ 151.804 & 107.674 & 58.2435 & 75 \end{pmatrix}$$

Angle relation checks for i = 1..4:

Vertex 1
$\alpha1 - \beta1 = 61.144$
$\alpha1 - \gamma1 = 11.894$
$\alpha1 - \delta1 = -31.325$
$\beta1 - \gamma1 = -49.250$
$\beta1 - \delta1 = -92.469$
$\gamma1 - \delta1 = -43.218$
$\alpha1 + \beta1 - 180 = -63.794$
$\gamma1 + \delta1 - 180 = 16.782$
$\alpha1 + \gamma1 - 180 = -14.543$
$\beta1 + \delta1 - 180 = -32.469$
$\alpha1 + \delta1 - 180 = 28.675$
$\beta1 + \gamma1 - 180 = -75.687$
$\alpha1 + \beta1 - \gamma1 - \delta1 = -80.575$
$\alpha1 + \gamma1 - \beta1 - \delta1 = 17.925$
$\alpha1 + \delta1 - \beta1 - \gamma1 = 104.360$

Vertex 2
$\alpha2 - \beta2 = 34.914$

$\alpha2 - \gamma2 = -5.970$
$\alpha2 - \delta2 = -15.750$
$\beta2 - \gamma2 = -40.884$
$\beta2 - \delta2 = -50.665$
$\gamma2 - \delta2 = -9.781$
$\alpha2 + \beta2 - 180 = -86.415$
$\gamma2 + \delta2 - 180 = -29.781$
$\alpha2 + \gamma2 - 180 = -45.531$
$\beta2 + \delta2 - 180 = -70.665$
$\alpha2 + \delta2 - 180 = -35.750$
$\beta2 + \gamma2 - 180 = -80.445$
$\alpha2 + \beta2 - \gamma2 - \delta2 = -56.634$
$\alpha2 + \gamma2 - \beta2 - \delta2 = 25.133$
$\alpha2 + \delta2 - \beta2 - \gamma2 = 44.695$

Vertex 3
$\alpha3 - \beta3 = 35.142$
$\alpha3 - \gamma3 = 58.426$
$\alpha3 - \delta3 = 63.808$
$\beta3 - \gamma3 = 23.284$
$\beta3 - \delta3 = 28.666$
$\gamma3 - \delta3 = 5.382$
$\alpha3 + \beta3 - 180 = 82.474$
$\gamma3 + \delta3 - 180 = -4.618$
$\alpha3 + \gamma3 - 180 = 59.190$
$\beta3 + \delta3 - 180 = 18.666$
$\alpha3 + \delta3 - 180 = 53.808$
$\beta3 + \gamma3 - 180 = 24.049$
$\alpha3 + \beta3 - \gamma3 - \delta3 = 87.092$
$\alpha3 + \gamma3 - \beta3 - \delta3 = 40.524$
$\alpha3 + \delta3 - \beta3 - \gamma3 = 29.759$

Vertex 4
$\alpha4 - \beta4 = 44.131$
$\alpha4 - \gamma4 = 93.561$
$\alpha4 - \delta4 = 76.804$
$\beta4 - \gamma4 = 49.430$
$\beta4 - \delta4 = 32.674$
$\gamma4 - \delta4 = -16.757$
$\alpha4 + \beta4 - 180 = 79.478$
$\gamma4 + \delta4 - 180 = -46.757$
$\alpha4 + \gamma4 - 180 = 30.048$
$\beta4 + \delta4 - 180 = 2.674$
$\alpha4 + \delta4 - 180 = 46.804$
$\beta4 + \gamma4 - 180 = -14.083$
$\alpha4 + \beta4 - \gamma4 - \delta4 = 126.230$
$\alpha4 + \gamma4 - \beta4 - \delta4 = 27.374$
$\alpha4 + \delta4 - \beta4 - \gamma4 = 60.887$

Out[99]=

================= NOT CONJUGATE-MODULAR =================

Mi $<$ 1 and pi $\in \mathbb{R}$ for all i = 1…4 $\Rightarrow$ NOT conjugate-modular. Boundary-strip switches preserve this.

Initial configuration (no switches applied):

$$\begin{pmatrix} 91.3249 & 27.5312 & 103.218 & 120 \\ 115.75 & 29.3354 & 109.781 & 80 \\ 31.192 & 113.666 & 89.6176 & 85 \\ 28.1955 & 107.674 & 121.757 & 75 \end{pmatrix}$$

M_i values:
M1 = 0.924668, M2 = 0.924668, M3 = 0.924668, M4 = 0.924668
Mi < 1 for all i = 1, ..., 4

Switch combination: Right

Switched anglesDeg:

$$\begin{pmatrix} 91.3249 & 152.469 & 76.7816 & 120 \\ 115.75 & 29.3354 & 109.781 & 80 \\ 31.192 & 113.666 & 89.6176 & 85 \\ 28.1955 & 72.3261 & 58.2435 & 75 \end{pmatrix}$$

M_i values:
M1 = 0.924668, M2 = 0.924668, M3 = 0.924668, M4 = 0.924668
Mi < 1 for all i = 1, ..., 4

Switch combination: Left

Switched anglesDeg:

$$\begin{pmatrix} 91.3249 & 27.5312 & 103.218 & 120 \\ 115.75 & 150.665 & 70.2192 & 80 \\ 31.192 & 66.3336 & 90.3824 & 85 \\ 28.1955 & 107.674 & 121.757 & 75 \end{pmatrix}$$

M_i values:
M1 = 0.924668, M2 = 0.924668, M3 = 0.924668, M4 = 0.924668
Mi < 1 for all i = 1, ..., 4

Switch combination: Lower

Switched anglesDeg:

$$\begin{pmatrix} 88.6751 & 152.469 & 103.218 & 120 \\ 64.2495 & 150.665 & 109.781 & 80 \\ 31.192 & 113.666 & 89.6176 & 85 \\ 28.1955 & 107.674 & 121.757 & 75 \end{pmatrix}$$

M_i values:
M1 = 0.924668, M2 = 0.924668, M3 = 0.924668, M4 = 0.924668
Mi < 1 for all i = 1, ..., 4

Switch combination: Upper

Switched anglesDeg:

$$\begin{pmatrix} 91.3249 & 27.5312 & 103.218 & 120 \\ 115.75 & 29.3354 & 109.781 & 80 \\ 148.808 & 66.3336 & 89.6176 & 85 \\ 151.804 & 72.3261 & 121.757 & 75 \end{pmatrix}$$

M_i values:
M1 = 0.924668, M2 = 0.924668, M3 = 0.924668, M4 = 0.924668
Mi < 1 for all i = 1, ..., 4

Switch combination: Right + Left

Switched anglesDeg:

$$\begin{pmatrix} 91.3249 & 152.469 & 76.7816 & 120 \\ 115.75 & 150.665 & 70.2192 & 80 \\ 31.192 & 66.3336 & 90.3824 & 85 \\ 28.1955 & 72.3261 & 58.2435 & 75 \end{pmatrix}$$

Mᵢ values:
M1 = 0.924668, M2 = 0.924668, M3 = 0.924668, M4 = 0.924668
Mi < 1 for all i = 1, ..., 4

Switch combination: Right + Lower

Switched anglesDeg:

$$\begin{pmatrix} 88.6751 & 27.5312 & 76.7816 & 120 \\ 64.2495 & 150.665 & 109.781 & 80 \\ 31.192 & 113.666 & 89.6176 & 85 \\ 28.1955 & 72.3261 & 58.2435 & 75 \end{pmatrix}$$

Mᵢ values:
M1 = 0.924668, M2 = 0.924668, M3 = 0.924668, M4 = 0.924668
Mi < 1 for all i = 1, ..., 4

Switch combination: Right + Upper

Switched anglesDeg:

$$\begin{pmatrix} 91.3249 & 152.469 & 76.7816 & 120 \\ 115.75 & 29.3354 & 109.781 & 80 \\ 148.808 & 66.3336 & 89.6176 & 85 \\ 151.804 & 107.674 & 58.2435 & 75 \end{pmatrix}$$

Mᵢ values:
M1 = 0.924668, M2 = 0.924668, M3 = 0.924668, M4 = 0.924668
Mi < 1 for all i = 1, ..., 4

Switch combination: Left + Lower

Switched anglesDeg:

$$\begin{pmatrix} 88.6751 & 152.469 & 103.218 & 120 \\ 64.2495 & 29.3354 & 70.2192 & 80 \\ 31.192 & 66.3336 & 90.3824 & 85 \\ 28.1955 & 107.674 & 121.757 & 75 \end{pmatrix}$$

Mᵢ values:
M1 = 0.924668, M2 = 0.924668, M3 = 0.924668, M4 = 0.924668
Mi < 1 for all i = 1, ..., 4

Switch combination: Left + Upper

Switched anglesDeg:

$$\begin{pmatrix} 91.3249 & 27.5312 & 103.218 & 120 \\ 115.75 & 150.665 & 70.2192 & 80 \\ 148.808 & 113.666 & 90.3824 & 85 \\ 151.804 & 72.3261 & 121.757 & 75 \end{pmatrix}$$

Mᵢ values:
M1 = 0.924668, M2 = 0.924668, M3 = 0.924668, M4 = 0.924668
Mi < 1 for all i = 1, ..., 4

Switch combination: Lower + Upper

Switched anglesDeg:

$$\begin{pmatrix} 88.6751 & 152.469 & 103.218 & 120 \\ 64.2495 & 150.665 & 109.781 & 80 \\ 148.808 & 66.3336 & 89.6176 & 85 \\ 151.804 & 72.3261 & 121.757 & 75 \end{pmatrix}$$

M_i values:
M1 = 0.924668, M2 = 0.924668, M3 = 0.924668, M4 = 0.924668
Mi < 1 for all i = 1, ..., 4

Switch combination: Right + Left + Lower

Switched anglesDeg:

$$\begin{pmatrix} 88.6751 & 27.5312 & 76.7816 & 120 \\ 64.2495 & 29.3354 & 70.2192 & 80 \\ 31.192 & 66.3336 & 90.3824 & 85 \\ 28.1955 & 72.3261 & 58.2435 & 75 \end{pmatrix}$$

M_i values:
M1 = 0.924668, M2 = 0.924668, M3 = 0.924668, M4 = 0.924668
Mi < 1 for all i = 1, ..., 4

Switch combination: Right + Left + Upper

Switched anglesDeg:

$$\begin{pmatrix} 91.3249 & 152.469 & 76.7816 & 120 \\ 115.75 & 150.665 & 70.2192 & 80 \\ 148.808 & 113.666 & 90.3824 & 85 \\ 151.804 & 107.674 & 58.2435 & 75 \end{pmatrix}$$

M_i values:
M1 = 0.924668, M2 = 0.924668, M3 = 0.924668, M4 = 0.924668
Mi < 1 for all i = 1, ..., 4

Switch combination: Right + Lower + Upper

Switched anglesDeg:

$$\begin{pmatrix} 88.6751 & 27.5312 & 76.7816 & 120 \\ 64.2495 & 150.665 & 109.781 & 80 \\ 148.808 & 66.3336 & 89.6176 & 85 \\ 151.804 & 107.674 & 58.2435 & 75 \end{pmatrix}$$

M_i values:
M1 = 0.924668, M2 = 0.924668, M3 = 0.924668, M4 = 0.924668
Mi < 1 for all i = 1, ..., 4

Switch combination: Left + Lower + Upper

Switched anglesDeg:

$$\begin{pmatrix} 88.6751 & 152.469 & 103.218 & 120 \\ 64.2495 & 29.3354 & 70.2192 & 80 \\ 148.808 & 113.666 & 90.3824 & 85 \\ 151.804 & 72.3261 & 121.757 & 75 \end{pmatrix}$$

M_i values:
M1 = 0.924668, M2 = 0.924668, M3 = 0.924668, M4 = 0.924668
Mi < 1 for all i = 1, ..., 4

Switch combination: Right + Left + Lower + Upper

Switched anglesDeg:

$$\begin{pmatrix} 88.6751 & 27.5312 & 76.7816 & 120 \\ 64.2495 & 29.3354 & 70.2192 & 80 \\ 148.808 & 113.666 & 90.3824 & 85 \\ 151.804 & 107.674 & 58.2435 & 75 \end{pmatrix}$$

M_i values:
M1 = 0.924668, M2 = 0.924668, M3 = 0.924668, M4 = 0.924668
Mi < 1 for all i = 1, ..., 4

Out[101]=

================= NOT CHIMERA =================

Fails conic, orthodiagonal & isogonal tests for all i=1, ..., 4 ⇒ NOT chimera. Boundary-strip switches preserve these failures as demonstrated in the NOT CONIC, NOT ORTHODIAGONAL, and NOT ISOGONAL sections.