



Simulation Summary Report

Project Title: Plate with a hole (Mesh)

Description: 3D, Isotropic, Fracture Analysis, Quasi-Static, Mesh

Created By: pmasscasestudies

Project Created: 08/09/2023-16:33

Report Created: 10/31/2023-10:47

Analysis Type: Fracture Analysis

Solver: quasi-static

Dimension: 3

```
{
  "dateTime": {
    "month": "08",
    "hour": "16",
    "year": "2023",
    "day": "09",
    "minute": "33"
  },
  "time_increment": 1e-08,
  "quasi_static": {
    "max_iteration": 1000,
    "tolerance": 1e-07,
    "precondition": 1e-10
  },
  "feModels": [
    {
      "horizon": {
        "horizon_type": "sphere",
        "hr": 3.5
      },
      "elements_filename": "elements_hole.txt",
      "nodes_filename": "nodes_hole.txt",
      "name": "femodel1",
      "refinement": 0,
      "element_type": "Tetrahedron",
      "dimension": 3
    }
  ],
  "analysis": {
    "quasi_static": {
      "max_iteration": 1000,
      "tolerance": 1e-07,
      "precondition": 1e-10
    },
    "load_segments": [
      {
        "name": "ls1",
        "type": "quasi-static",
        "num_save": 1,
        "ratio_segment": 1,
        "num_segment": 1
      }
    ],
    "iteration_damage": "false",
    "max_bond_breakage": 6,
    "zero_energy": {
      "type": "bond-associated",
      "bond_associated_family": 1,
      "name": "analysis1",
      "type": "Fracture Analysis",
      "dimension": 3,
      "inclusion_damage": "true",
      "solver": "quasi-static",
      "time_increment": 1e-08
    },
    "materials": [
      {
        "density": 1e-05,
        "elastic_properties": {
          "E": 68000,
          "G": 25000,
          "nu": 0.36
        },
        "name": "mat1",
        "failure_parameters": {
          "Scr": 0,
          "Xc": 0,
          "type": "Critical-Stretch",
          "Eccr": 0,
          "ft": 0,
          "S23": 0,
          "Stcr": 0,
          "w0": 0,
          "Xt": 0,
          "s0": 0.01,
          "Etc": 0,
          "ef": 0,
          "c": 0,
          "Yc": 0,
          "D1": 0,
          "D2": 0,
          "D3": 0,
          "D4": 0,
          "phi": 0,
          "D5": 0,
          "Ecr": 0,
          "S12": 0,
          "Scr": 0,
          "Yt": 0,
          "fc": 0
        },
        "behavior": "elastic",
        "type": "isotropic",
        "dimension": 3
      }
    ],
    "plotSetting": {
      "markerSize": "5",
      "markerOpacity": "1",
      "cameraEye": {
        "x": "1",
        "y": "1",
        "z": "1"
      },
      "edgeColor": "middlegray",
      "edgeWidth": "0.05",
      "markerColor": "mutedblue",
      "colorscale": "RdBu",
      "materialColor": "blue",
      "lineColor": "black",
      "damageColor": "red",
      "aspectRatio": {
        "x": "1",
        "y": "1",
        "z": "1"
      },
      "lineWidth": "1",
      "iteration_damage": "false",
      "project_name": "Plate with a hole (Mesh)",
      "max_bond_breakage": 6,
      "owner": "pmasscasestudies",
      "models": [
        {
          "output_zones": [],
          "random_solids": [],
          "solids": [],
          "failure_zones": [
            {
              "name": "nf1",
              "dimension": 3,
              "geometry": {
                "length": [10.1, 1.1, 2.4],
                "center": [5, 0.5, 0]
              },
              "name": "geo1",
              "roll": 0,
              "pitch": 0,
              "type": "cuboid",
              "yaw": 0
            },
            {
              "name": "nf2",
              "dimension": 3,
              "geometry": {
                "length": [10.1, 1.1, 2.4],
                "center": [5, 0.5, 20]
              },
              "name": "geo1",
              "roll": 0,
              "pitch": 0,
              "type": "cuboid",
              "yaw": 0
            }
          ],
          "name": "model1",
          "boundary_zones": [
            {
              "name": "bc1",
              "geometry": {
                "length": [10, 1, 1.2],
                "center": [5, 0.5, 0]
              },
              "name": "geo1",
              "roll": 0,
              "pitch": 0,
              "type": "cuboid",
              "yaw": 0,
              "dimension": 3,
              "properties": {
                "type": "displacement",
                "value": 0,
                "direction": "X"
              }
            },
            {
              "name": "bc2",
              "geometry": {
                "length": [10, 1, 1.2],
                "center": [5, 0.5, 0]
              },
              "name": "geo1",
              "roll": 0,
              "pitch": 0,
              "type": "cuboid",
              "yaw": 0,
              "dimension": 3,
              "properties": {
                "type": "displacement",
                "value": 0,
                "direction": "Y"
              }
            },
            {
              "name": "bc3",
              "geometry": {
                "length": [10, 1, 1.2],
                "center": [5, 0.5, 0]
              },
              "name": "geo1",
              "roll": 0,
              "pitch": 0,
              "type": "cuboid",
              "yaw": 0,
              "dimension": 3,
              "properties": {
                "type": "displacement",
                "value": -0.4,
                "direction": "Z"
              }
            },
            {
              "name": "bc6",
              "geometry": {
                "length": [10, 1, 1.2],
                "center": [5, 0.5, 20]
              },
              "name": "geo1",
              "roll": 0,
              "pitch": 0,
              "type": "cuboid",
              "yaw": 0,
              "dimension": 3,
              "properties": {
                "type": "displacement",
                "value": 0.4,
                "direction": "Z"
              }
            },
            {
              "name": "bc4",
              "geometry": {
                "length": [10, 1, 1.2],
                "center": [5, 0.5, 20]
              },
              "name": "geo1",
              "roll": 0,
              "pitch": 0,
              "type": "cuboid",
              "yaw": 0,
              "dimension": 3,
              "properties": {
                "type": "displacement",
                "value": 0,
                "direction": "X"
              }
            },
            {
              "name": "bc5",
              "geometry": {
                "length": [10, 1, 1.2],
                "center": [5, 0.5, 20]
              },
              "name": "geo1",
              "roll": 0,
              "pitch": 0,
              "type": "cuboid",
              "yaw": 0,
              "dimension": 3,
              "properties": {
                "type": "displacement",
                "value": 0,
                "direction": "Y"
              }
            }
          ],
          "cracks": [],
          "laminate_solids": [],
          "dimension": 3,
          "voids": [],
          "inclusions": []
        }
      ],
      "inclusion_damage": "true",
      "project_id": "2484a09a-8438-4a6a-9f83-8af499285147",
      "description": "3D, Isotropic, Fracture Analysis, Quasi-Static, Mesh"
    }
  }
}
```

Undeformed Grid

Number of Points: 58375

min-x: 0.0399675

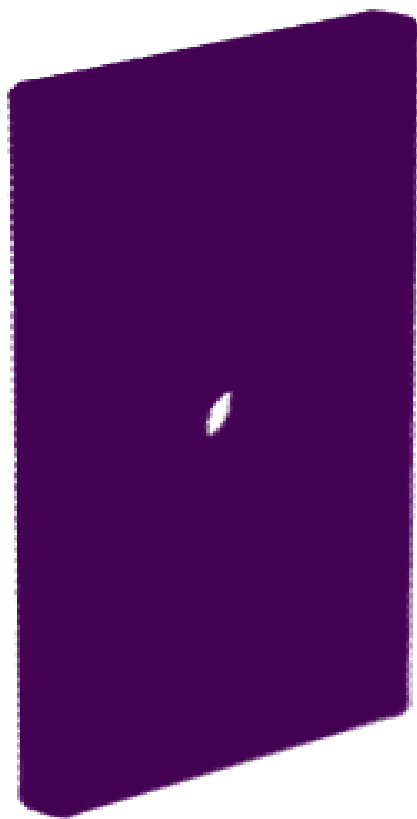
max-x: 9.956915

min-y: 0.0387025

max-y: 0.960695

min-z: 0.043685

max-z: 19.95501



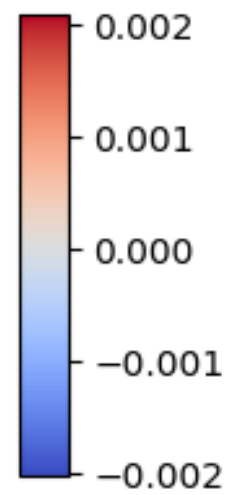
Run Name: run0

Solution Output: out_0_90

Field: u-x

min-u-x: -0.00201621

max-u-x: 0.00208934



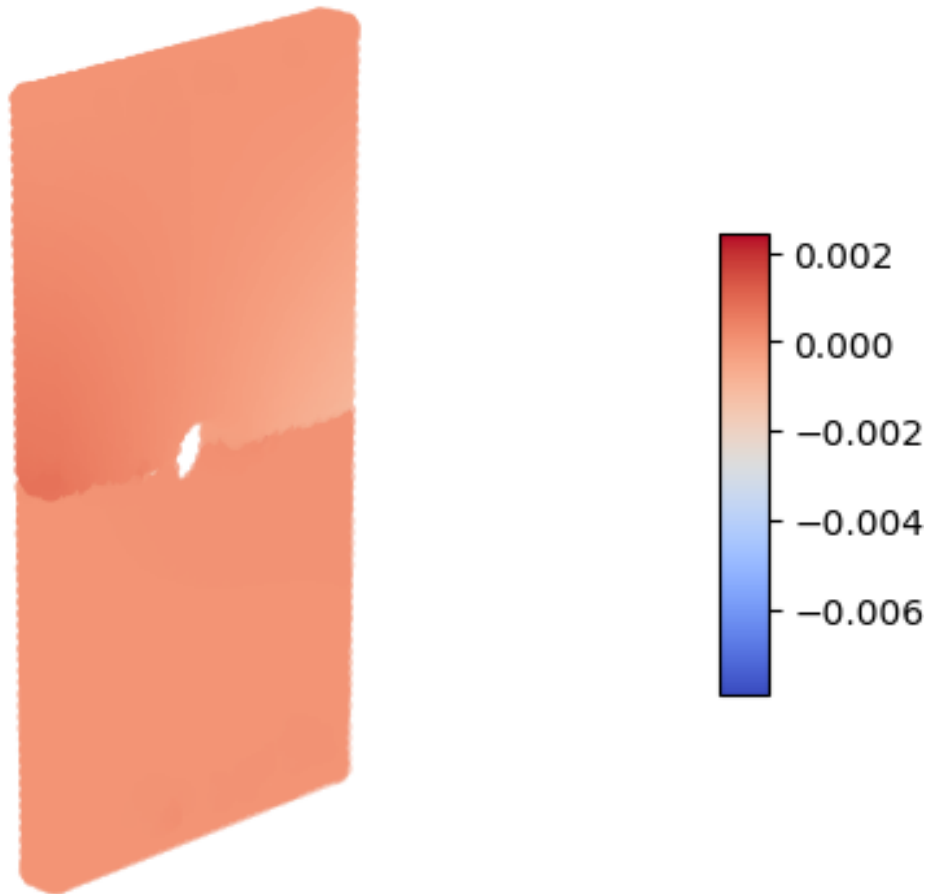
Run Name: run0

Solution Output: out_0_90

Field: u-y

min-u-y: -0.0078582

max-u-y: 0.00242908



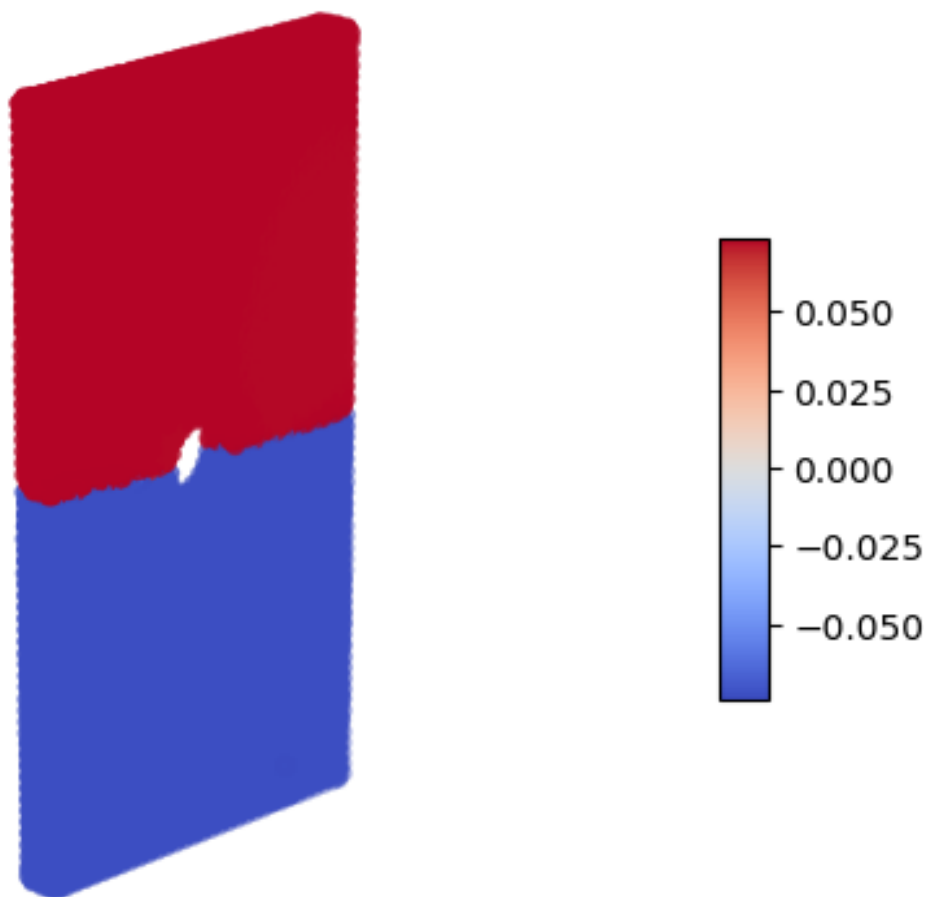
Run Name: run0

Solution Output: out_0_90

Field: u-z

min-u-z: -0.0737706

max-u-z: 0.0733438



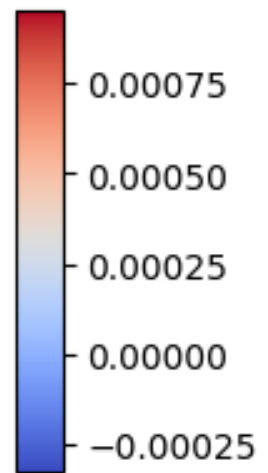
Run Name: run0

Solution Output: out_0_90

Field: e-x

min-e-x: -0.000322369

max-e-x: 0.000952663



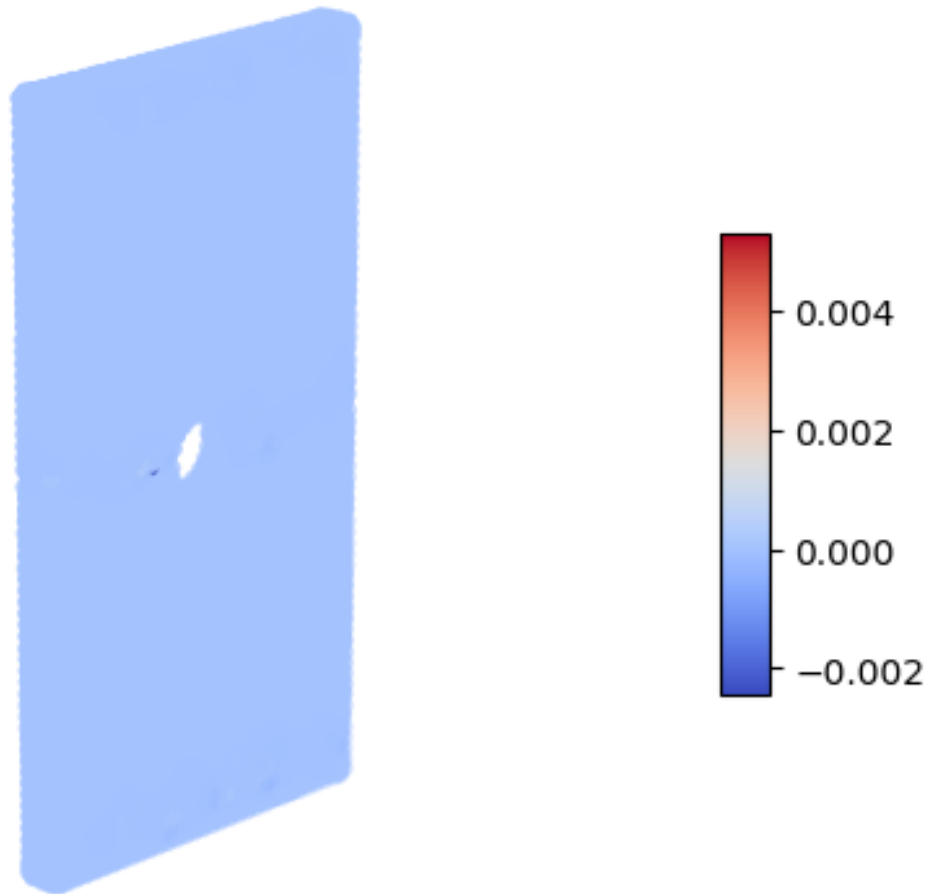
Run Name: run0

Solution Output: out_0_90

Field: e-y

min-e-y: -0.00242359

max-e-y: 0.0052908



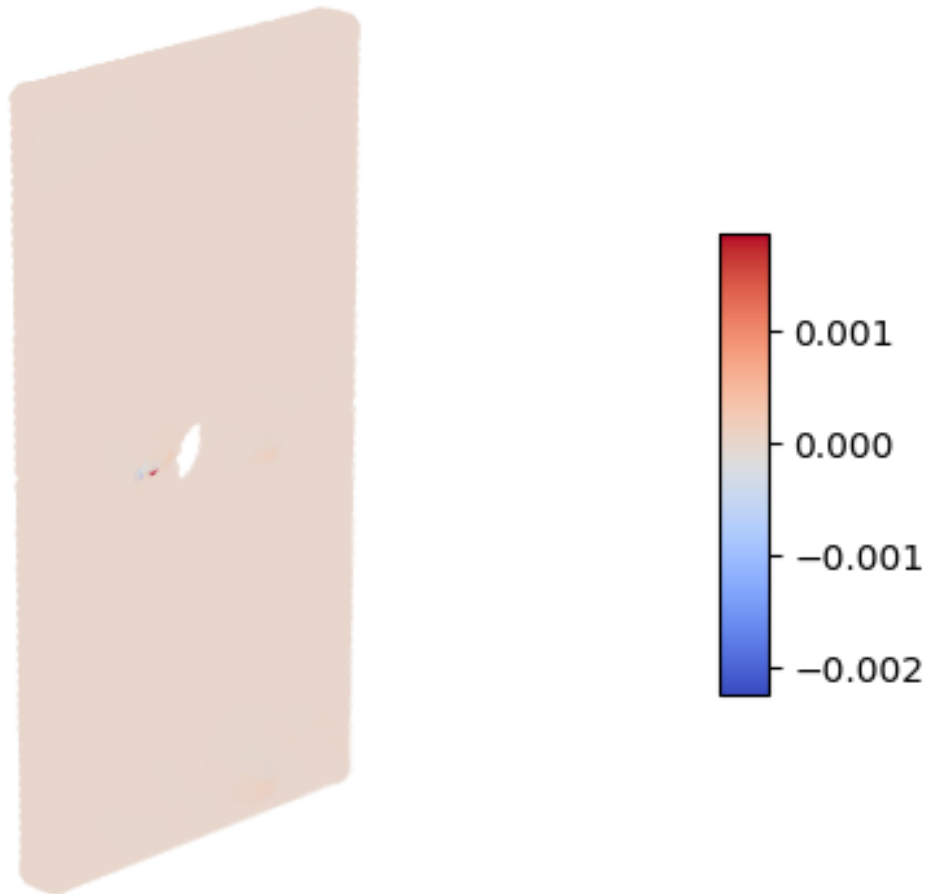
Run Name: run0

Solution Output: out_0_90

Field: e-z

min-e-z: -0.00223111

max-e-z: 0.00186426



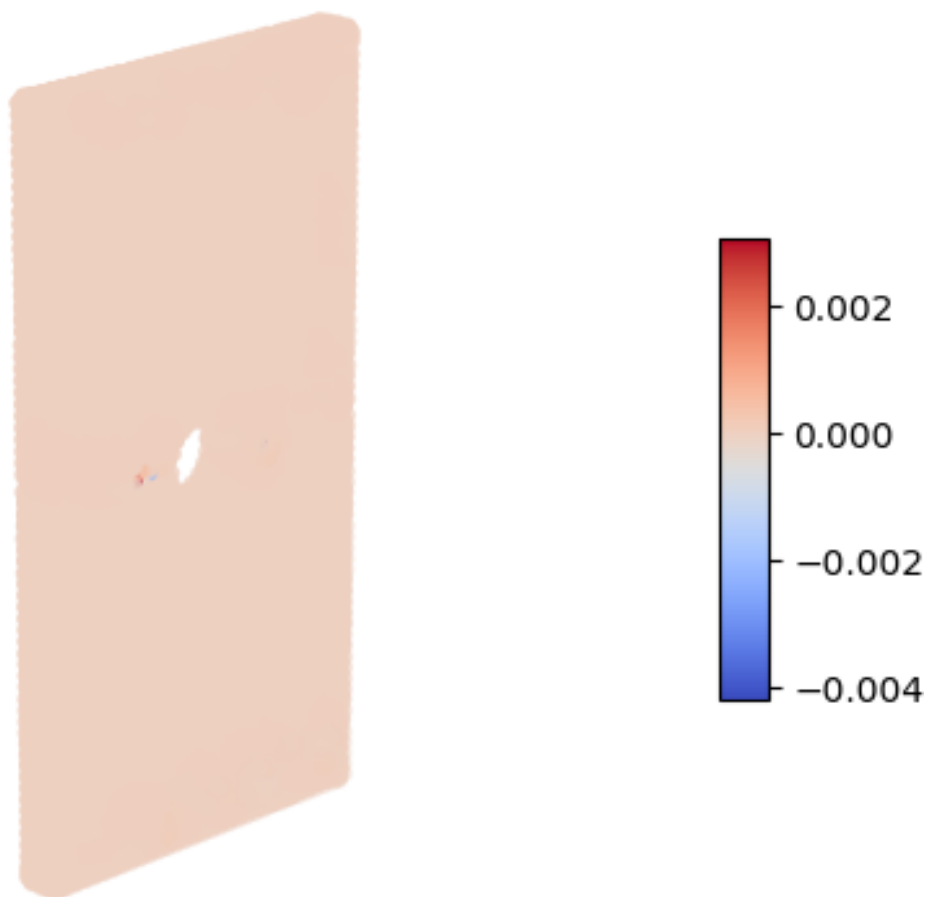
Run Name: run0

Solution Output: out_0_90

Field: e-xy

min-e-xy: -0.00418618

max-e-xy: 0.00306123



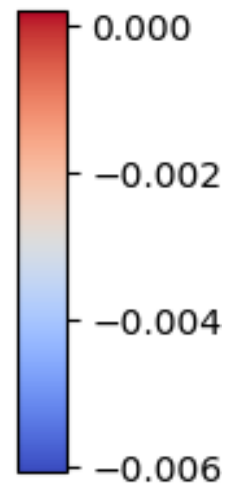
Run Name: run0

Solution Output: out_0_90

Field: e-yz

min-e-yz: -0.00604834

max-e-yz: 0.000212213



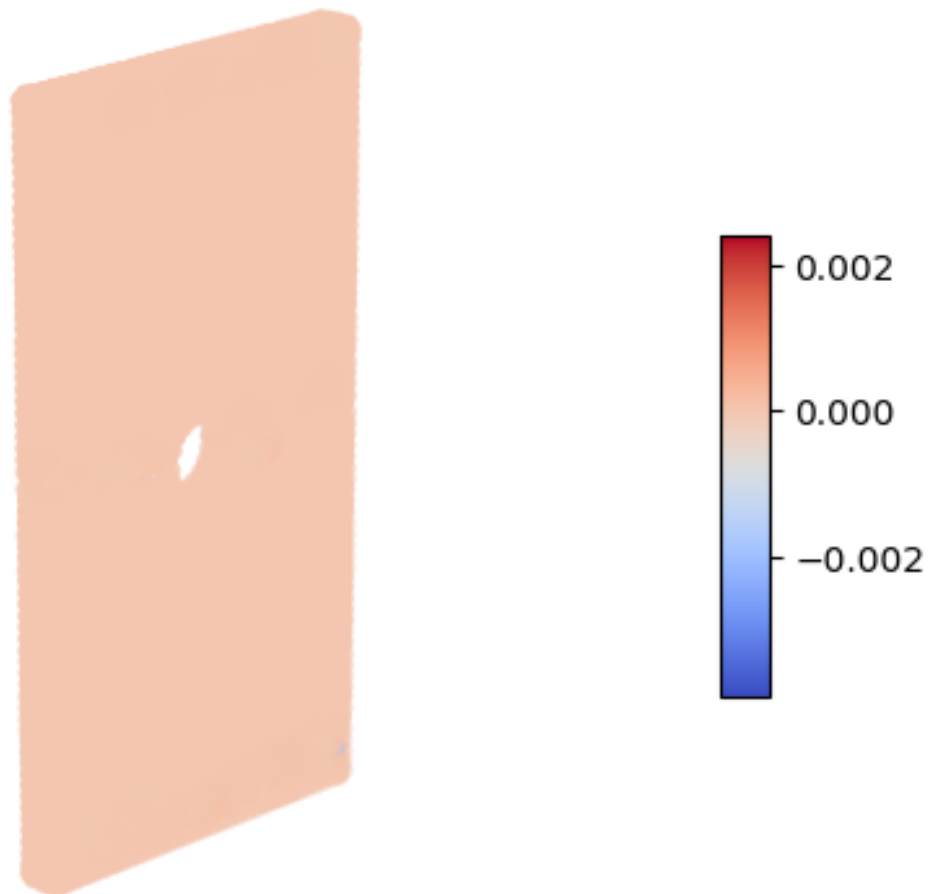
Run Name: run0

Solution Output: out_0_90

Field: e-zx

min-e-zx: -0.00391788

max-e-zx: 0.0024104



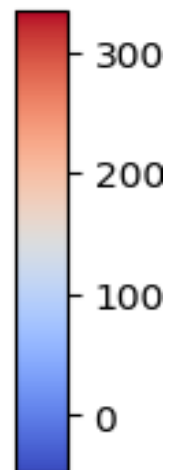
Run Name: run0

Solution Output: out_0_90

Field: s-x

min-s-x: -45.5299

max-s-x: 334.364



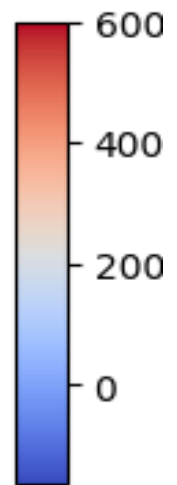
Run Name: run0

Solution Output: out_0_90

Field: s-y

min-s-y: -161.133

max-s-y: 600.022



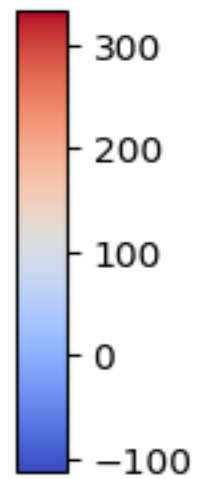
Run Name: run0

Solution Output: out_0_90

Field: s-z

min-s-z: -111.915

max-s-z: 332.992



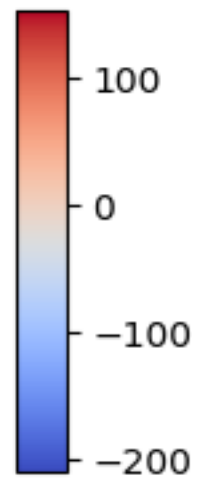
Run Name: run0

Solution Output: out_0_90

Field: s-xy

min-s-xy: -209.309

max-s-xy: 153.061



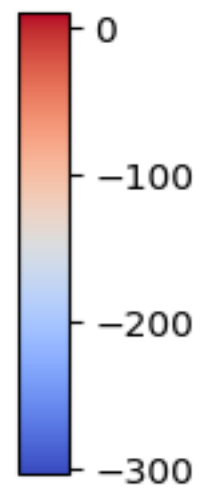
Run Name: run0

Solution Output: out_0_90

Field: s-yz

min-s-yz: -302.417

max-s-yz: 10.6106



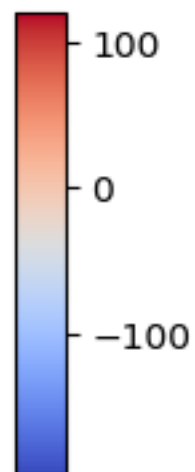
Run Name: run0

Solution Output: out_0_90

Field: s-zx

min-s-zx: -195.894

max-s-zx: 120.52



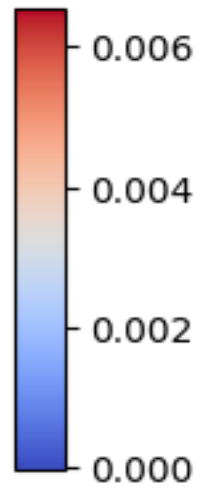
Run Name: run0

Solution Output: out_0_90

Field: e-p1

min-e-p1: -9.15723e-06

max-e-p1: 0.00654351



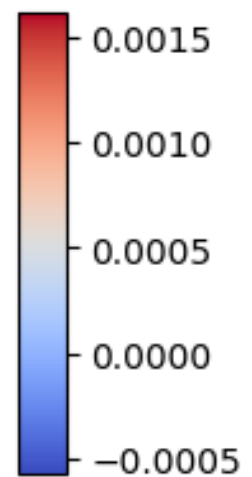
Run Name: run0

Solution Output: out_0_90

Field: e-p2

min-e-p2: -0.00056448

max-e-p2: 0.00161709



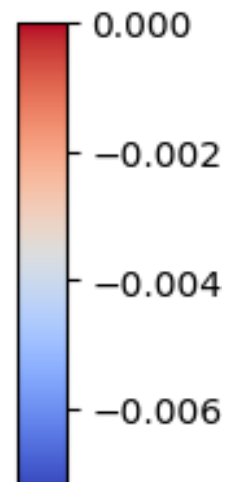
Run Name: run0

Solution Output: out_0_90

Field: e-p3

min-e-p3: -0.0071303

max-e-p3: 4.35092e-07



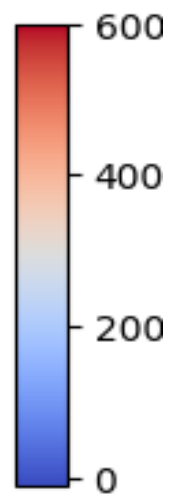
Run Name: run0

Solution Output: out_0_90

Field: s-p1

min-s-p1: -10.0028

max-s-p1: 600.025



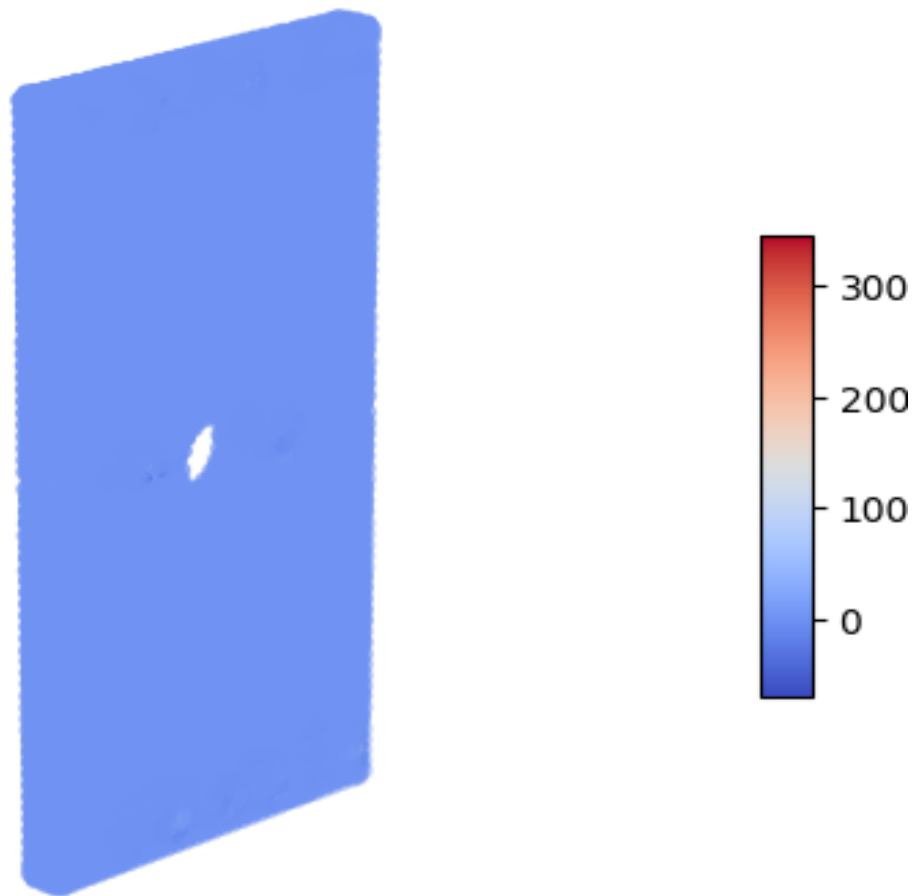
Run Name: run0

Solution Output: out_0_90

Field: s-p2

min-s-p2: -69.9183

max-s-p2: 346.068



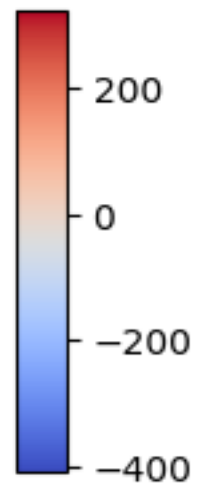
Run Name: run0

Solution Output: out_0_90

Field: s-p3

min-s-p3: -405.416

max-s-p3: 321.285



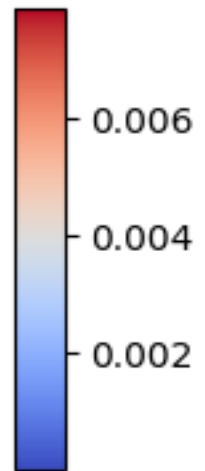
Run Name: run0

Solution Output: out_0_90

Field: e-eq

min-e-eq: 1.23293e-12

max-e-eq: 0.00789498



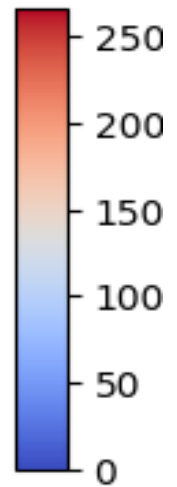
Run Name: run0

Solution Output: out_0_90

Field: s-eq

min-s-eq: 7.27596e-11

max-s-eq: 266.347



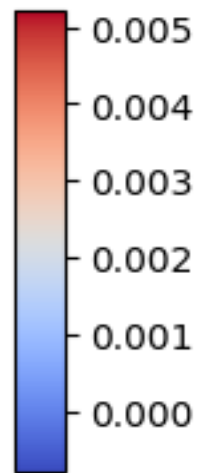
Run Name: run0

Solution Output: out_0_90

Field: e-vol

min-e-vol: -0.000761286

max-e-vol: 0.00521823



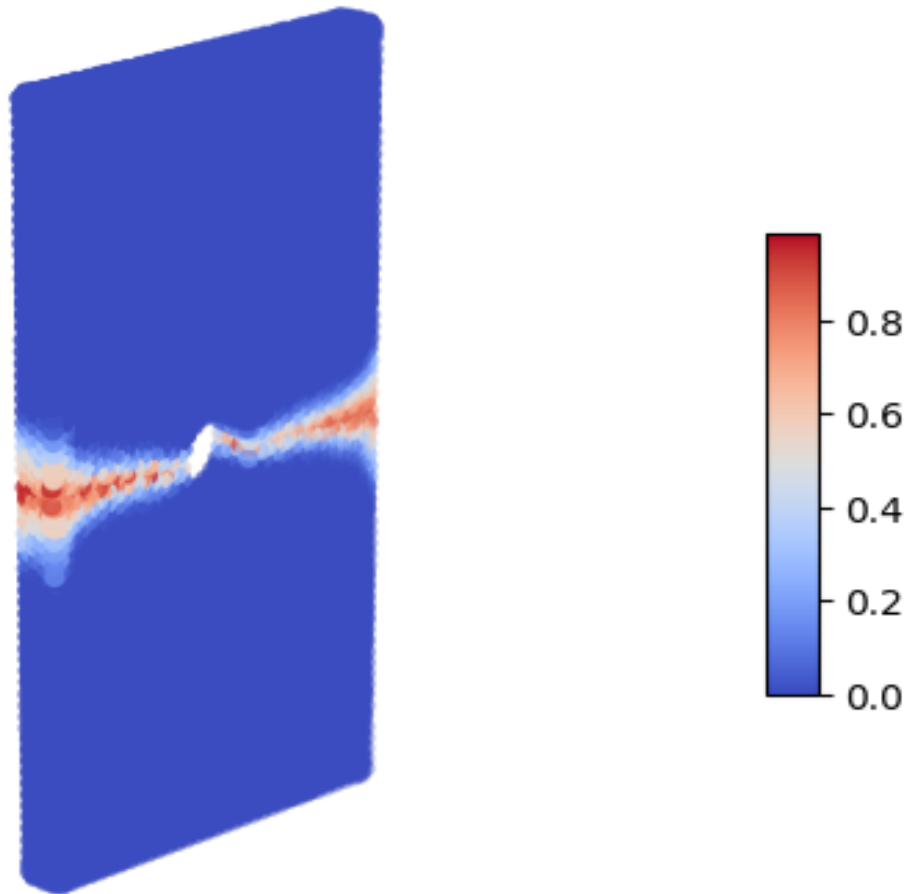
Run Name: run0

Solution Output: out_0_90

Field: damage-ini

min-damage-ini: 0.0

max-damage-ini: 0.987342



Run Name: run0

Solution Output: out_0_90

Field: damage

min-damage: 0.0

max-damage: 0.987342

