

Shock Finding Algorithms



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BoSSS.Solution.CompressibleFlowCommon.ShockFinding

InflectionPointFinder.cs

LevelSetReconstruction.cs

ShockFindingExtensions.cs



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Where to find in BoSSS?

BoSSS.Solution.CompressibleFlowCommon.ShockFinding

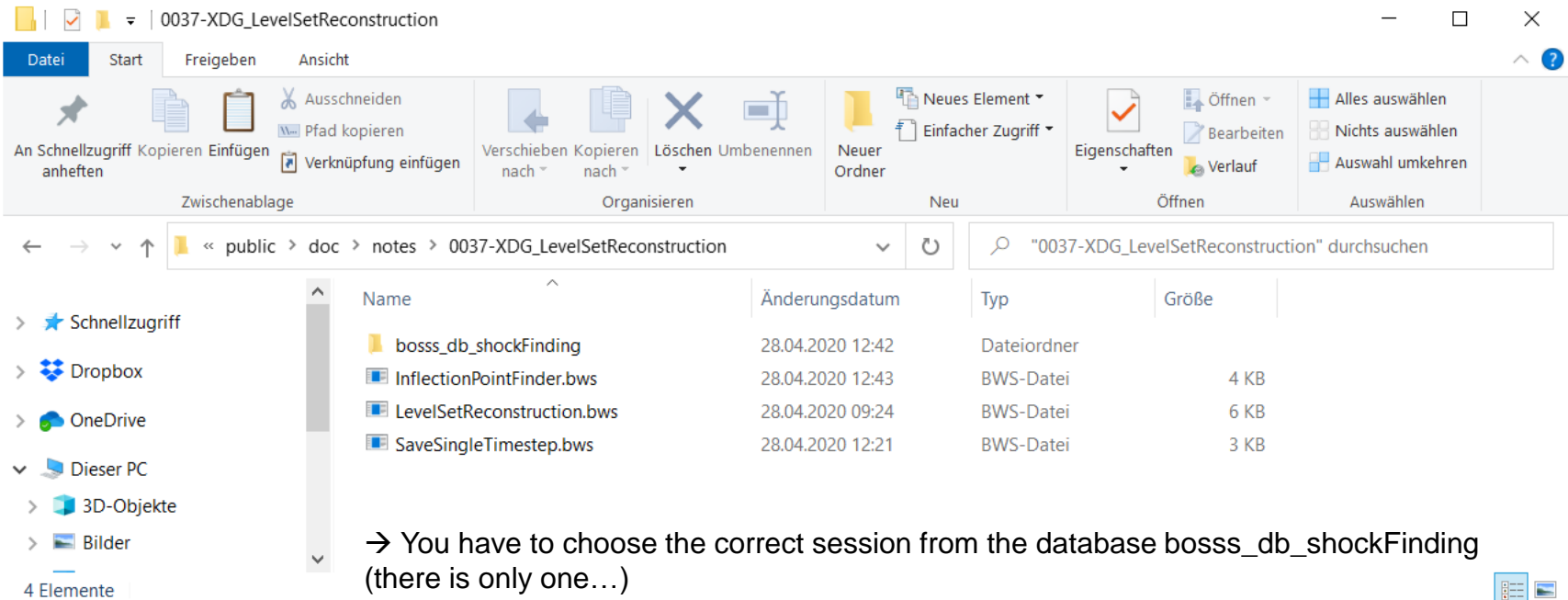


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Do you want to try?



0037-XDG_LevelSetReconstruction

Datei Start Freigegeben Ansicht

An Schnellzugriff anheften Kopieren Einfügen Zwischenablage Pfad kopieren Verknüpfung einfügen Verschieben nach Organisieren Kopieren nach Löschen Umbenennen Neuer Ordner Neu Neues Element Einfacher Zugriff Öffnen Eigenschaften Verlaufsverlauf Bearbeiten Alles auswählen Nichts auswählen Auswahl umkehren Auswählen

« public » doc » notes » 0037-XDG_LevelSetReconstruction

Suche "0037-XDG_LevelSetReconstruction" durchsuchen

Name	Änderungsdatum	Typ	Größe
bosss_db_shockFinding	28.04.2020 12:42	Dateiordner	
InflectionPointFinder.bws	28.04.2020 12:43	BWS-Datei	4 KB
LevelSetReconstruction.bws	28.04.2020 09:24	BWS-Datei	6 KB
SaveSingleTimestep.bws	28.04.2020 12:21	BWS-Datei	3 KB

→ You have to choose the correct session from the database bosss_db_shockFinding (there is only one...)



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InflectionPointFinder.cs

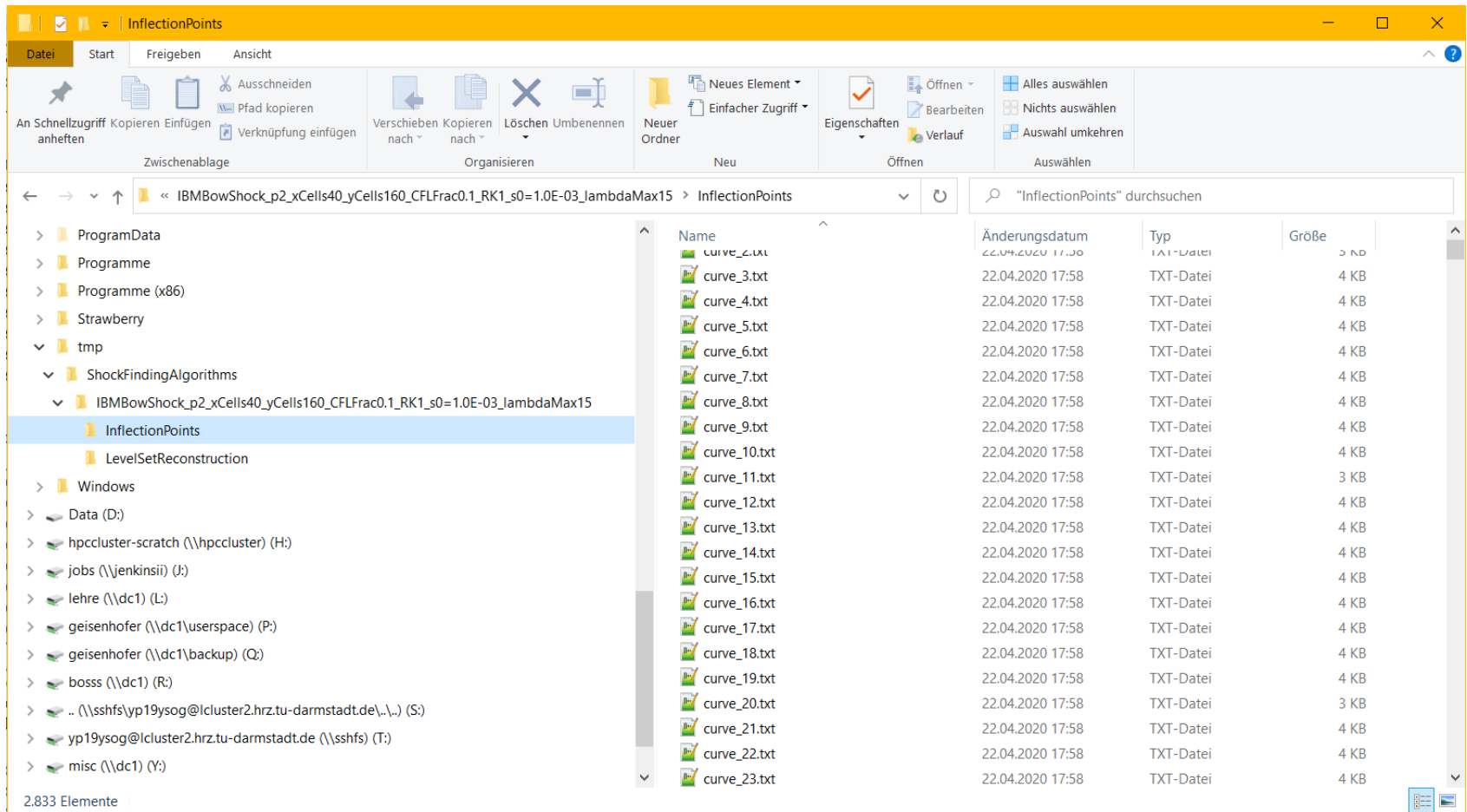
InflectionPointFinder.cs



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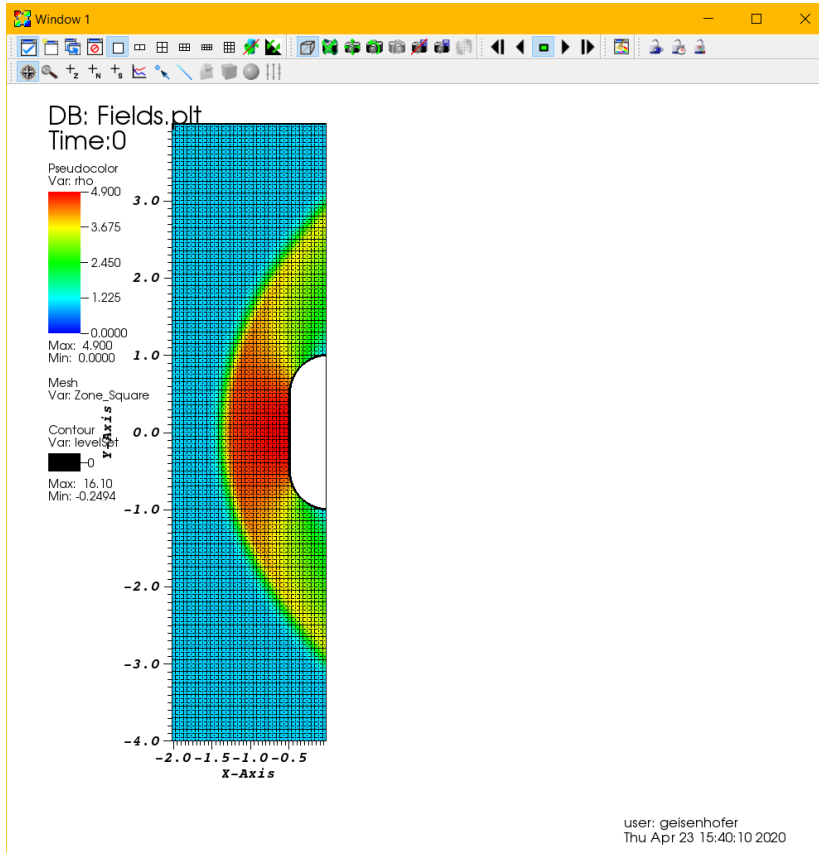
```
BoSSSPad (InflectionPointFinder.bws*)
File Edit Commands
6: IBMBowShock_P2 IBMBowShock_p2_xCells40_yCells160_CFLFrac0.1_RK1_s0=5.0E-04_lambdaMax15 01/14/2020 18:01:48 c8bec0df...
7: IBMBowShock_P2 IBMBowShock_p2_xCells40_yCells160_CFLFrac0.1_RK1_s0=1.0E-03_lambdaMax15 01/14/2020 17:45:38 895907a0...
8: IBMBowShock_P2 IBMBowShock_p2_xCells40_yCells160_CFLFrac0.1_RK1_s0=1.0E-04_lambdaMax15 01/15/2020 06:24:30 1004422c...
}
13
14 // Select sessions
15 List<ISessionInfo> sessions = new List<ISessionInfo>();
16 sessions.Add(database.Sessions.Pick(7));
17
18 // Create Directories
19 string mainPath = @"C:\tmp\ShockFindingAlgorithms\";
20 string directoryName = @"InflectionPoints";
21 string[] sessionPathsInflec = ShockFindingExtensions.CreateDirectories(mainPath, directoryName, sessions);
22 //ShockFindingExtensions.EmptyDirectories(mainPath, directoryName, sessions);
23
24 // Select seeding setup
25 SeedingSetup seeding = SeedingSetup.av;
26
27 // Find the inflection points
28 InflectionPointFinder[] finders = new InflectionPointFinder[sessions.Count];
29
30 foreach(ISessionInfo session in sessions){
31     int count = 0;
32
33     InflectionPointFinder finder = new InflectionPointFinder(sessionPathsInflec[count], session);
34
35     finder.FindPoints(seeding: seeding, patchRecoveryGradient: true, patchRecoveryHessian: true);
36     finder.Plot(plotDGFields: true, plotSeedingsPoints: true, plotInflectionsPoints: true, plotCurves: true, plotStartEndPairs: true);
37     finder.Results.SaveResults(finder.SessionPath);
38     finder.ResultsExtended.SaveResults(finder.SessionPath);
39
40     finders[count] = finder;
41
42     count++;
43 }
Total number of seeding points: 1412
WALKING ON CURVES: START
(Counting starts with 0)
Patch recovery of field gradientX started...
finished
Patch recovery of field gradientY started...
```

InflectionPointFinder.cs



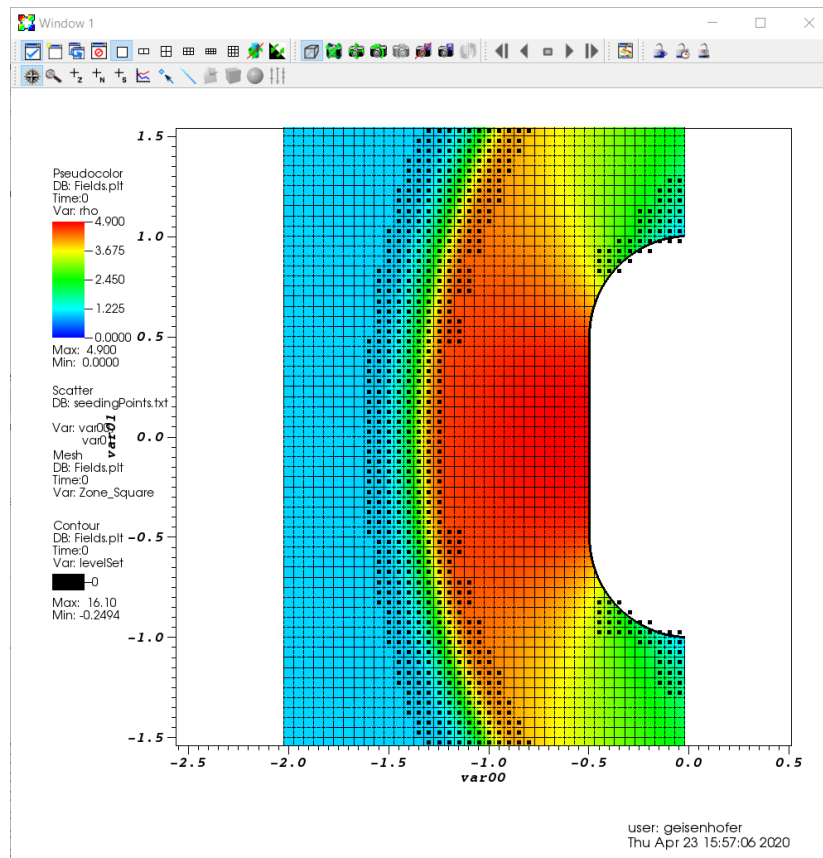
InflectionPointFinder.cs

- CNS (IBM) simulation
 - 2nd order
 - With artificial viscosity

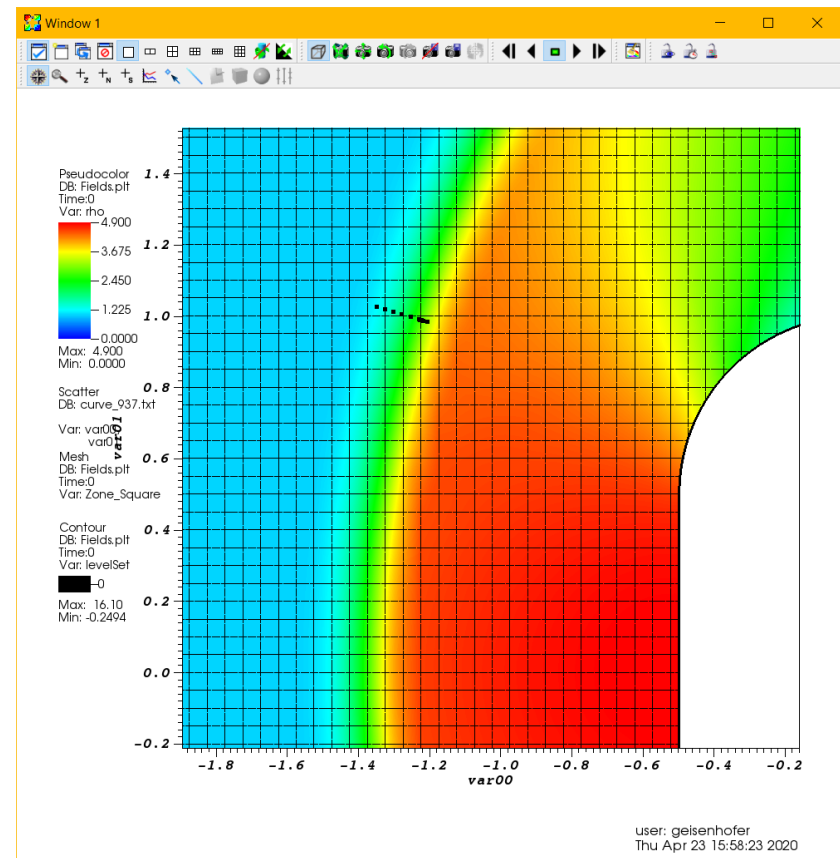


InflectionPointFinder.cs

seedingPoints.txt

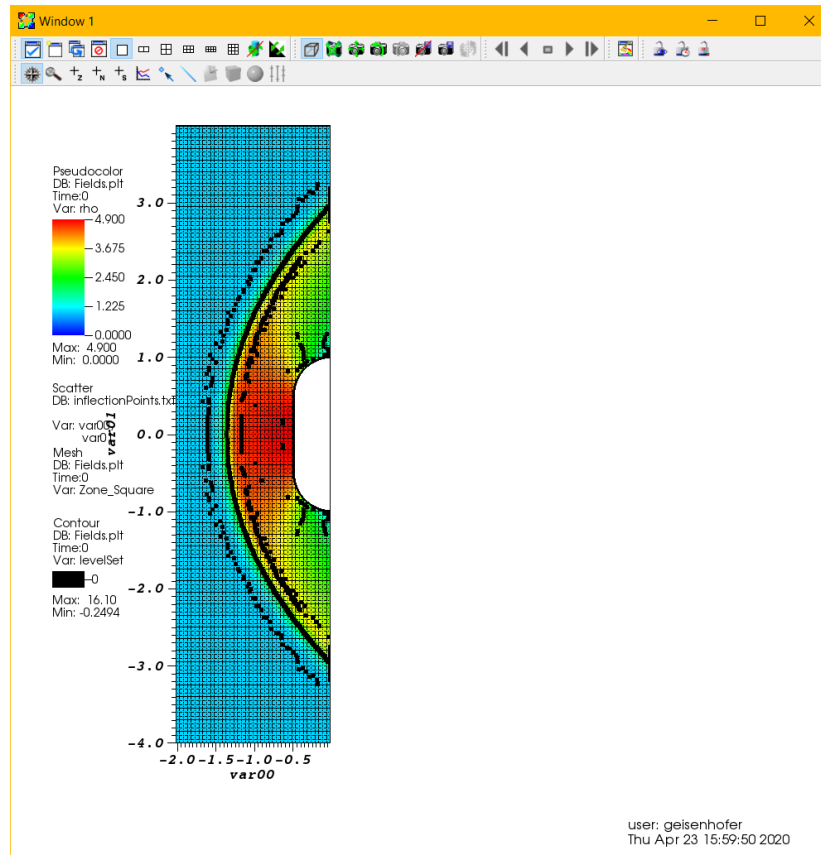


curves_*.txt

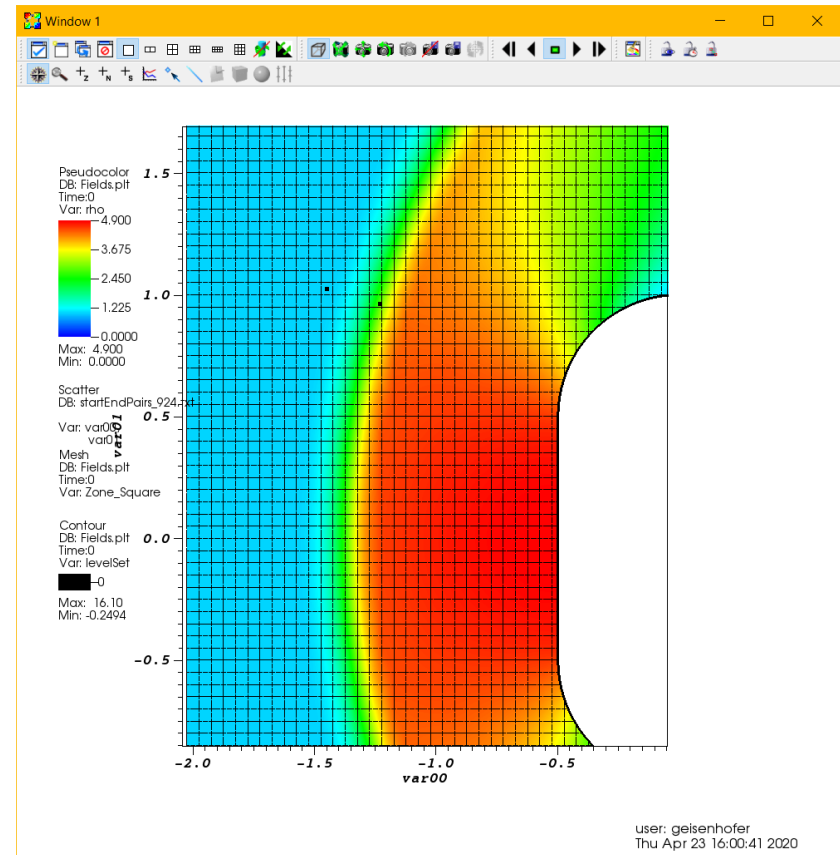


InflectionPointFinder.cs

inflectionPoints.txt



startEndPairs_*.txt





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LevelSetReconstruction.cs

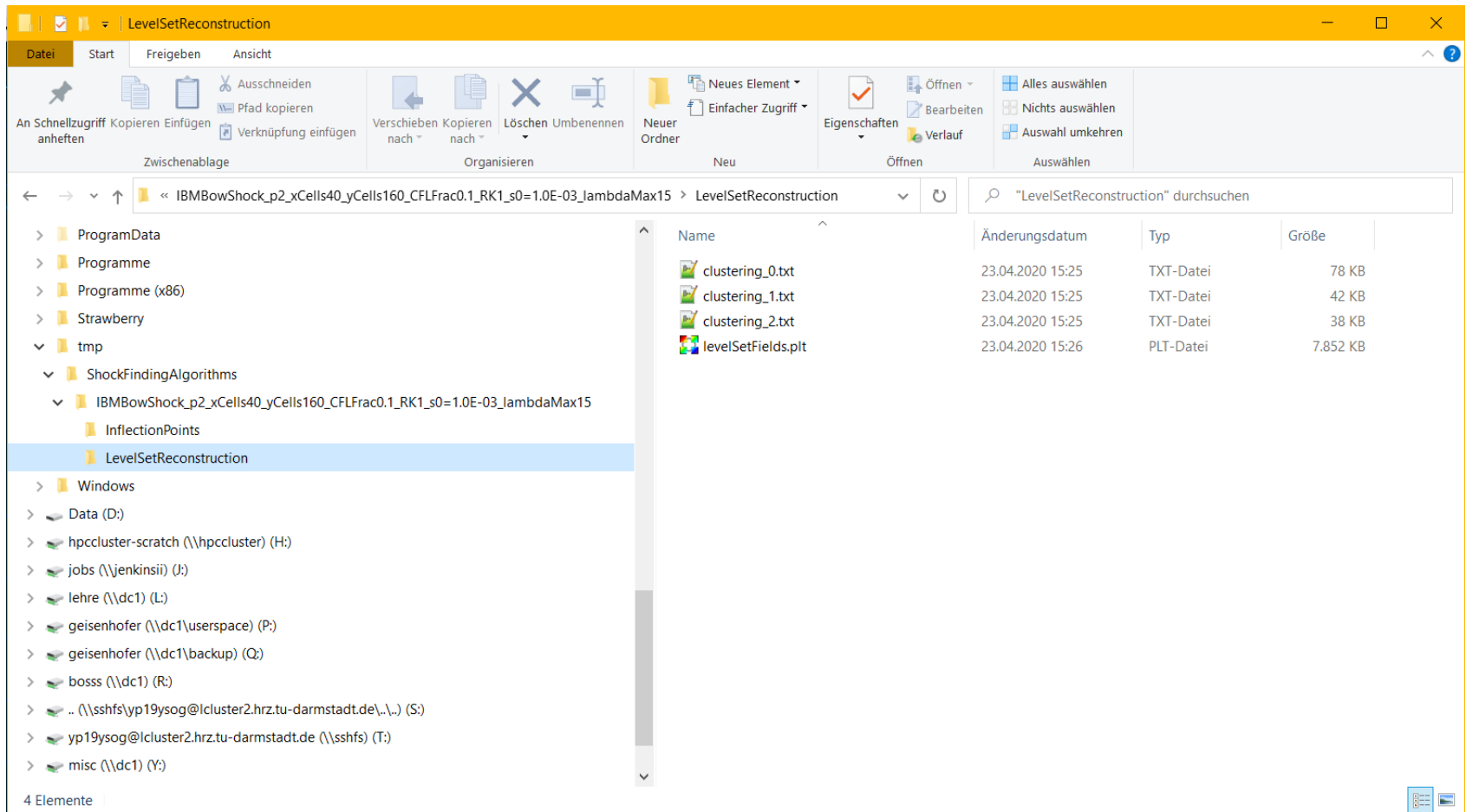
LevelSetReconstruction.cs



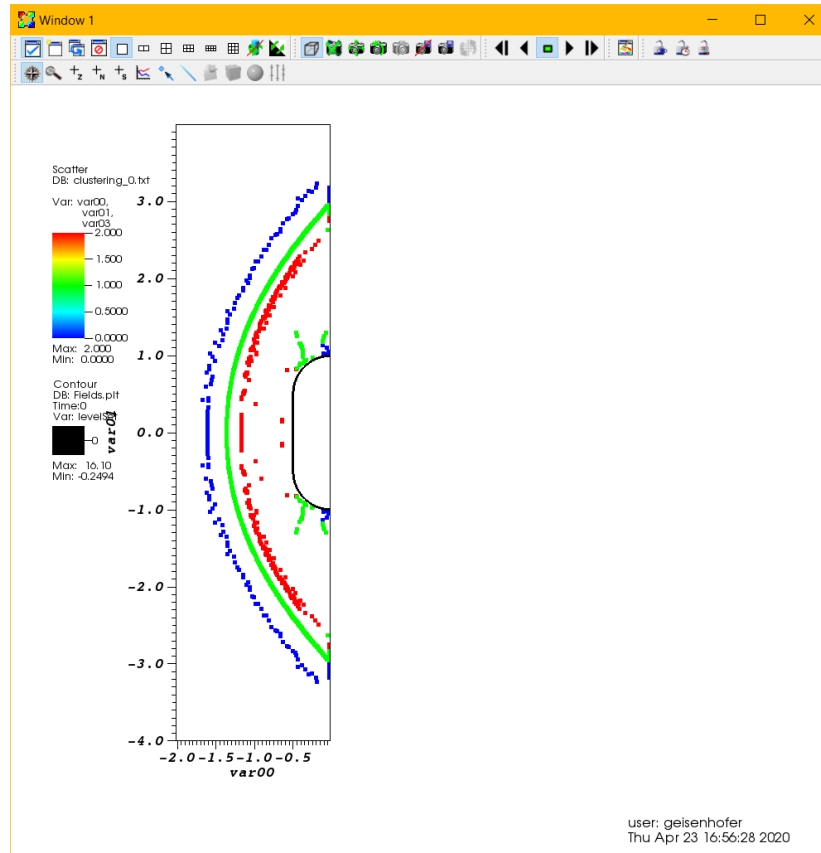
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```
BoSSSPad (LevelSetReconstruction.bws)
File Edit Commands
14 // Select sessions
15 List<ISessionInfo> sessions = new List<ISessionInfo>();
16 sessions.Add(database.Sessions.Pick(7));
17
18 // Create Directories
19 string mainPath = @"C:\tmp\ShockFindingAlgorithms\";
20 string[] sessionPathsRecon = ShockFindingExtensions.CreateDirectories(mainPath, @"LevelSetReconstruction", sessions);
21 ShockFindingExtensions.EmptyDirectories(mainPath, @"LevelSetReconstruction", sessions);
22
23 string[] sessionPathsInflec = ShockFindingExtensions.CreateDirectories(mainPath, @"InflectionPoints", sessions);
24 LevelSetReconstruction[] recons = new LevelSetReconstruction[sessions.Count];
25 InflectionPointFinder[] finders = null;
26
27 foreach (ISessionInfo session in sessions) {
28     int count = 0;
29
30     MultidimensionalArray results;
31     MultidimensionalArray resultsExtended;
32     if (finders == null) {
33         results = ShockFindingExtensions.LoadResults(sessionPathsInflec[count]);
34         resultsExtended = ShockFindingExtensions.LoadResultsExtended(sessionPathsInflec[count]);
35     } else {
36         results = finders[count].Results;
37         resultsExtended = finders[count].ResultsExtended;
38     }
39
40     LevelSetReconstruction lsr = new LevelSetReconstruction(sessionPathsRecon[count], session, results, resultsExtended);
41
42     // Clustering zero (density)
43     MultidimensionalArray clusteringZero = lsr.CreateClustering_Density(3, new double[] {1.0, 2.7, 5.0});
44     lsr.SaveClusteringToTextFile(clusteringZero);
45     MultidimensionalArray clusterZero = lsr.SelectCluster(clusteringZero, clusterToSelect: 1);
46
47     // Clustering two (artificial viscosity)
48     MultidimensionalArray clusteringOne = lsr.CreateClustering_AV(clusterZero, 2, new double[] {0.0, 0.0});
49     lsr.SaveClusteringToTextFile(clusteringOne);
50     MultidimensionalArray clusterOne = lsr.SelectCluster(clusteringOne, clusterToSelect: 0);
51
52     // Clustering three (eliminate boundary cells)
53     MultidimensionalArray clusteringTwo = lsr.CreateClustering_Boundary(clusterOne);
54     lsr.SaveClusteringToTextFile(clusteringTwo);
55
56     // Reconstruct level set field
57     lsr.ReconstructLevelSet(patchRecovery: true, continuous: true);
58
59     // Plot level set fields
60     lsr.PlotFields();
61
62     recons[count] = lsr;
63
64     count++;
65 }
CreateClustering_Density: START
CreateClustering_Density: END
```

LevelSetReconstruction.cs



LevelSetReconstruction.cs

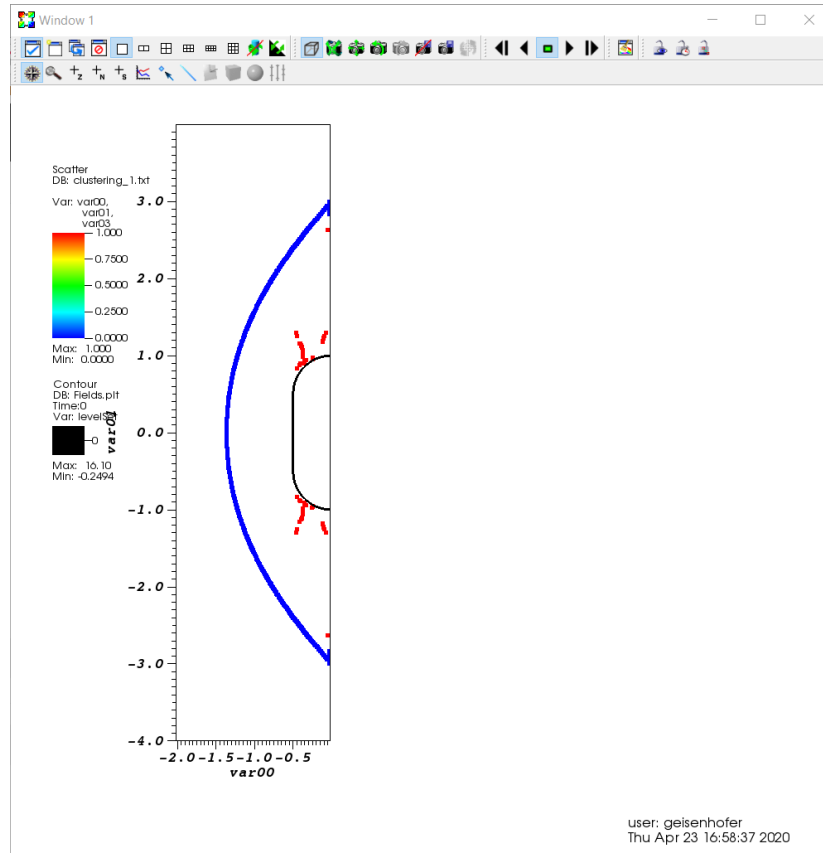


Clustering 0:

- By density

→ Select green cluster

LevelSetReconstruction.cs



Clustering 1:

- By artificial viscosity
- Select blue cluster

LevelSetReconstruction.cs

Clustering 2:

- Eliminate boundary cells

