### List of codes

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| No. | Code name | Functionality | Notes |
| 1 | Split\_am.py | To separate an .am file to two files  Input: .am files conducted by Avizo after image segmentation and saved as “binary” format.  Output: 2 files, one is the header of the .am file, and the other is the binary parts of the .am file. | Python script.  Running command can be either  $ python split\_am.py \*.am (to process the single file)  or  $ python split\_am.py (to process one or more files that names are listed in **amfiles.txt**) |
| 2 | Adheader.f90 | To add a file header to a raw file  Input: raw file without header  Output: raw file with a header of 13-bit presenting nbit, nz, ny, nx respectively, followed by the original data.  This 13-bit header used commonly in our analysis, 13-bit=1-bit of nbit, 4-bit of nz, 4-bit of ny, and 4-bit of nx. | Fortran code.  Can process one or more raw files, file-name and the volume size should be listed in the file of **addheader.dat**.  This code also converts 4-byte data to 1-byte data. It can be modified for your purpose. |
| 3 | Shrink.f90 | To shrink the target phase as described in Section 4.3 of the paper.  Input: a segmented binary file  Output: a binary file with the target phase shrunk | Fortran code.  Can process the data for one or more shrinking steps, the input file-name and output file-name after shrinking should be listed in the file **shk\_list.dat**. |
| 4 | Expand.f90 | To expand the target phase as described in Section 4.3 of the paper.  Input: a segmented binary file  Output: a binary file with the target phase expanded. | Fortran code.  Can process the data for one or more expanding steps, the input file-name and expanded output file-name should be listed in the file **epd\_list.dat**. |
| 5 | Select\_cube.f90 | To select a small sub-volume that with the same porosity as the original volume  Input: segmented data of the output of “split\_am.py” or a raw data file with a 13-bit header, its porosity is φ.  Output: a selected cube with specific side-length written in raw format | Fortran code.  Sub-volumes satisfying the criteria of porosity=φ±0.5 at different positions are available to be selected, when one cube is selected, data are written in output file. This kind of sub-volumes are used in determining the mechanical RVE.  The file-name of data to be processed should be in the file **select\_cube.dat**. |
| 6 | Ctsta10.f90 | Refer to: <https://github.com/Liujie-SYSU/CTSTA> (10 is the number of version) | |
| 7 | Sta\_clus.f90 | To perform statistical analysis of clusters of the output file of ctsta10.f90  Input: .clus file of the output of ctsta code  Output: .cnss – the numbers of clusters of different-sizes and the contribution to porosity | Fortran code.  Post-processing of ctsta code to obtain statistical parameters of clusters.  The file-name of data that will be processed should be listed in the file **sta\_clus.dat**. |
| 8 | Clusize.f90 | To further processing cluster data  Input: .cnss of the output of sta\_clus.f90  Output: .mscl – mean size of clusters | Fortran code.  Post-processing of ctsta code to obtain the mean cluster size according to the percolation theory.  The file-name of data that will be processed should be listed in the file **clusize.dat**. |
| 9 | Fractal.f90 | To calculate the fractal dimension based on cluster data  Input: .clus of the output file of ctsta  Output: .ftdm relative size and counting of clusters that can be directly used in Excel to fit the fractal dimension | Fortran code.  Post-processing of ctsta code to fit the fractal dimension based on clusters.  The file-name of data that will be processed should be listed in the file **clus\_fract.dat**. |
| 10 | Stereo.f90 | To convert the orientation of each cluster to be used on Stereo32  Input: .out2 and .out4 of ctsta code  Output: \*\_EV1.txt, \*\_EV2.txt, \*\_EV3.txt which are the azimuth and dip of 3 eigenvectors in the stereo-net | Fortran code.  Post-processing of ctsta code to plot stereo-net figures of the orientations of clusters.  The file-name of data that will be processed should be listed in the file **stereo.dat**. |