

DIT

Displacement Inversion Tool

NOTE: THIS IS JUST AN EDUCATIONAL CODE. IT MAY BE SUBJECTED TO MANY FLAWS.
USE IT AT YOUR OWN RISK.

This set of MATLAB Programs use OKADA code to estimate the coefficient matrix and displacements on the given station(s), then adds some normally distributed noise (errors) to the data and performs Linear Inversion and statistical assessment of the data.

The Okada code (distributed package name is Okada85) is written and developed by François Beauducel <beauducel@ipgp.fr>. Please read the Copyright© terms of his package. I hereby thank him for his work, and ask you to respect his terms of use. You can download his full package from Mathworks™ website (<http://www.mathworks.com/>).

The main package is “DIT.m”. It contains the forward modeling, in which you obtain the displacement on surface, and the inverse modeling, in which it adds some normally distributed errors to the data and calculates the inverse model. You must do some modifications based on your desired case to obtain the answer. In the “setting up constant” section, you must indicate the required variables according to given explanation in front of them. Also, you must modify the “Reading Source Info” section so the code can read the specifications of your source. By default, prof. M. Mai’s data bank (<http://equake-rc.info/>) has been used, so you must enter the fault’s specifications according to his data set.

I have coarsened the initial meshing of the case I was investigating (1994 Northridge earthquake solution by Zeng and Anderson) by a factor of four along the length and width of the fault, which results in 1/16 number of total cells in sum. You can modify it the way you want to either leave the meshing as it is or by any factor you deem necessary.

I have added some statistical assessments to see which method can yield the best results. You can add your own tests and see the changes due to your variations. Feel free to change each variable and see their impact on the results and their instabilities. Also I have developed some codes for the needed purposes, which could come in handy for other calculations too. Give them a try and modify them to suit your needs. The help and explanations for each of them is given in the files.

Like every other person, I may have made some mistakes. If you shall come across one, please email it to me, so I can fix it ASAP. If you want to see something added to this package, you can get involved to improve the quality and quantity of this work.

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