1996 CREWES software release

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ABSTRACT

This paper gives a brief overview of the contents of the 1996 CREWES software release.

OVERVIEW

In the course of performing our research, we often write computer programs to test new ideas and to solve new kinds of problems. Our goal is to deliver the results of our work, not only in the form of a research report, but also as prototype software. The software release lets sponsors obtain implementations of new algorithms. It should be noted that all the code we release is prototype code. Our goal is not to produce polished, commercial software products, but to create test programs. Sponsor companies who wish to use these programs in a production environment are advised to study them carefully, understand how they work, and perform a significant amount of testing.

This document only serves to advertise the presence of the software release. Full documentation for the programs is included with the software release, on the 1996 CREWES CD. An envelope containing the CD and the full documentation was distributed at the 1996 sponsors meeting at Kananaskis Lodge. Sponsors can request an additional copy of the release by contacting the CREWES Project:

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All of the CREWES software is also available over the Internet via the CREWES Web page: http://www.crewes.ucalgary.ca/

CONTENTS OF THE 1996 SOFTWARE RELEASE

Matlab seismic toolbox - update

This is a collection of single channel seismic processing routines, seismic data input/output and viewing routines written by Dr. Gary Margrave. This toolbox adds tremendously to the power of the Matlab computing environment, making it an almost ideal platform for the testing and development of new seismic processing techniques. This is an update of the seismic toolbox, first released in 1995.

Matlab is a commercial product which provides a computing environment with high performance vector, matrix and visualization functions. The Matlab package is available for most Unix platforms, MS-Windows and Macintosh PC's and even

supercomputers. Once code is developed for Matlab, it will run on all Matlab supported platforms.

Matlab implementation of Synth - update

The Synth program performs PP, PS and SS offset stack synthetic seismogram generation. It is based on raytracing of flat layers using the bisection method for solving the ray parameter. Reflection coefficients are computed using the Zoeppritz formulae of Aki and Richards, as coded by E.S. Krebes. Synthetic seismograms are created by stacking NMO-corrected traces over a range of offsets. This is an update of this program, first released in 1995 (Margrave and Foltinek, 1995).

Seisimage and FX transform for signal bandwidth estimate

Fxtran calculates the f-x spectrum of an input seismic data set and returns the complex phase and amplitude spectra. It is purely a numerical computation routine. *Seisimage* uses an interactive display which incorporates *fxtran*. (Schoepp and Margrave, 1996).

Migration toolbox

This is a collection of textbook seismic migration routines that has been used for instructional purposes. Algorithms include f-k, Kirchhoff, and phaseshift migrations. Also includes f-k transforms.

Slicetool

This tool provides interactive viewing and manipulation of a random Earth Object. It is used here for horizon-based graphical interpretation

Zoepplot

This routine plots P-P and P-S refection amplitude curves, using the Zoepritz equation. Raytracing is done to relate the offsets to incident angles. Examples are seen in Simin and Margrave, 1996, ch42.

Plus-Minus Time Analysis - PMT

A complete interactive application for near-surface refraction analysis, written in Matlab. PMT provides a reliable near-surface model with accurate depths and velocities, and also source and receiver static corrections derived from this near surface model. (Dufour and Foltinek, 1996, ch13)

Matlab/Promax gateway

This package allows for a two-way communications link to be established between Matlab and the ProMAX processing system. It allows for easy development of new seismic processing tools using the high level Matlab language, while having access to ProMAX for existing processing modules, dataset and database information. (Bland, 1996, ch11)

P-S inversion

BLIMP is a Matlab routine to compute the impedance inversion of stacked traces. The method combines the low-frequency trend in the impedance estimate with the mid to high-frequency trend from the seismic data. This assumes that any impedance anomaly of interest lies in the seismic band. (Ferguson and Margrave, 1996)

CONCLUSION

The CREWES Project software release is a collection of prototype code. Much of our code is in a state of continuous evolution, so please ask us about updates of any modules you are using. The hope is that the software release is an effective means of technology transfer to our sponsors that complements the CREWES Research Report. Please let us know if you have any questions or comments about this or any other software release.

REFERENCES

Bland, H. C., 1996, A Matlab interface to ProMAX, The CREWES Project Research Report - V8, ch 10.

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