



Illinois Society of Professional Engineers - University of Illinois
College of Engineering
Professional Engineer On-Line Seminars



INSTRUCTIONS:

1. View the on-line seminar.
2. Complete the quiz below.
3. Complete the "Engineer Information" section.
4. Make a copy for your records.
5. Mail the quiz along with your \$20 payment (credit card information or check payable ISPE) to:
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If you score an 80% or better on the quiz, you will receive your certificate within 4 weeks. If you fail to earn an 80% score, the quiz will be returned to you and you will have the opportunity to retake it.

Each seminar/quiz is worth 1 Professional Development Hour.

QUIZ: 03-02
Topic: Novel Techniques for Subsurface Imaging
Presenter: Prof. Bojan Guzina

1. The purpose of wave based imaging is to detect subsurface features, hidden to the eye, without direct excavation. (circle) TRUE FALSE
2. Wave based imaging
(a) Is a forward problem (b) Is an inverse problem
(c) Always has a unique solution (d) All of the above
(e) None of the above
3. The forward problem of wave scattering is to find out the response of a given medium to a given source excitation. (circle) TRUE FALSE
4. Wave based imaging involves
(a) Sending excitations through a medium (b) Measuring response of the medium
(c) Predicting features within the medium (d) All of the above
(e) None of the above
5. Wave based imaging methods such as Radar, Sonar and Seismic Imaging can be used for
(a) Geometric identification (b) Material identification
(c) Both (d) None
6. Finite difference techniques are generally used for geometric identification while boundary integral techniques are generally used for material identification. (circle) TRUE FALSE
7. Acoustic and Electromagnetic imaging involves
(a) Scalar pressure field (b) Infinite medium
(c) Far field measurements (d) All of the above
(e) None of the above
8. 3D seismic imaging involves
(a) Vector & tensor fields (b) Semi-infinite medium
(c) Multiple wave types (d) Near and far field measurements
(e) All of the above

QUIZ 03-02 CONTINUED

9. Which of the following are 3D seismic waves
(a) Compression waves (b) Shear waves
(c) Love waves (d) Raleigh waves
(e) All of the above
10. In what order are the following steps carried out in the presented method to solve the 3D seismic imaging problem:
(1) Compute the response of the medium
(2) Assume the size, shape and number of cavities present in the medium
(3) Use gradient based minimization to compute an improved solution of the cavities
(4) Construct a cost function of the difference between computed and measured response

(a) 1, 2, 3, 4 (b) 4, 3, 2, 1
(c) 2, 3, 4, 1 (d) 2, 1, 4, 3
(e) None of the above
11. The gradient based minimization will converge to the true solution no matter what the initial guess.
(circle) TRUE FALSE
12. Which of the following techniques has been used to obtain initial guesses for to the gradient based minimization procedure
(a) Linear sampling method (b) Topological derivative method
(c) Both (d) None
13. The methods for generating initial guesses give better results for the vertical location rather than the horizontal location of the cavities. (circle) TRUE FALSE
14. The multi-tonal approach uses superposition to improve the initial guesses.
(circle) TRUE FALSE
15. In the linear sampling method the solution blows up
(a) at the boundary of the cavity (b) inside the cavity
(c) outside the cavity (d) none of the above

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