

# Reflection seismic 1 script

## **Educational Material**

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## Exercise for Reflection seismic 1 - Exercise 3 (03.12.2001)

(1) Determine the vertical and horizontal resolution for a seismic measurement at a depth  $z$  for a maximum frequency  $f$  and a seismic velocity  $v$ :

(a)  $f = 3.5 \text{ kHz}$ ;  $z = 50 \text{ m}$ ;  $v = 1600 \text{ m/s}$

(b)  $f = 30 \text{ Hz}$ ;  $z = 3000 \text{ m}$ ;  $v = 3500 \text{ m/s}$

(c)  $f = 100 \text{ Hz}$ ;  $z = 100 \text{ m}$ ;  $v = 1800 \text{ m/s}$

(d) Suggest a typical application for the resolution and parameters of (a), (b) und (c). Which seismic source is appropriate for (a), (b) und (c)?

(2) Calculate the following convolution  $x_k = g_k * f_k$

with  $g = 0, 1, 0, 3, 4, 5$

and  $f = 1, 4, 4, 1$

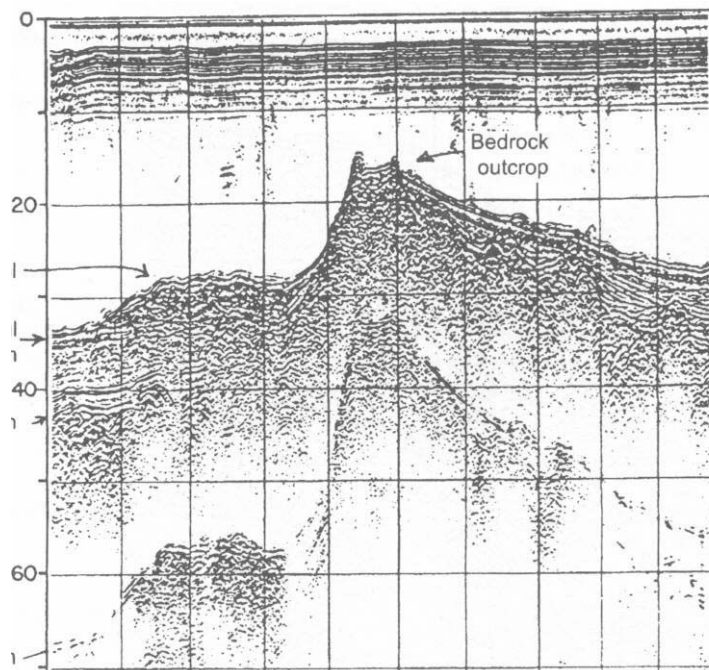
(3) Calculate the Autocorrelation  $\phi_{xx}$  for the following function:

$x_k = 1, 0, 2, 0, 1, 2, 1, 0, 0, 1, 2, 1$

with a shift from  $-5$  till  $+5$

(without normalisation)

(2) Identify the reflection and the accompanying multiple in the following figure:



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### Questions:

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