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Determination of dispersion curve of surface wave generated by impulsive source in shallow seismics

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With a development of mathematical modelling in geotechnics, the determination of material constants of the shallow geological subsurface has become the focus of interest. This subsurface is usually quite inhomogeneous, hence the results of the point geotechnical tests are not always representative. Some of the geotechnical parameters could be derived from the seismic measurement, that could characterize in global way individual quasi-homogeneous blocks of the subsurface. One of the important parameters is shear modulus of elasticity. Its determination is based on a direct measurement of the shear-wave velocity or it can be derived from the surface Rayleigh wave measurement. Using of the surface waves can overcome, in some cases, the limitations of other shallow seismic techniques, for example a velocity inversion including an existence of a cavity. The processing of the surface waves requires both sufficient length and wide dynamic range of seismograms. Majority of modern engineering seismographs used in the shallow refraction survey provides both these requirements. Hence the processing of the surface waves into a seismic interpretation yield a possibility to enhance new information about the site under investigation without necessity to extend the volume of field works. In the contribution presented we deal with the determination of the dispersion curve of Rayleigh surface waves based on waveforms of shallow seismic refraction data. We present quite simple but efficient method of the dispersion curve determination. The method is based on stretch impulsive data into frequency-swept data. After a separation of frequency components, we can determine phase velocities by simply measuring the linear slope of these frequency components. Advantage of this method is its independency on the geometry of the measurement, so we can also work with data from irregular profiles and also with data with variable offsets. The method is explained by means of a synthetic example and is also applied to real field data. It shows that this method can be useful, but it seems quite laborious

one. We plan to use this approach for comparison with interpretation of the Rayleigh waves by means of the wavelet transform.