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Investigation of Non-Linear Dynamics of the Rock Massive,Using Seismological Catalogue data and Induction Electromagnetic Monitoring Data in a Rock Burst Mine.

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Geological medium is an open dynamical system, which is influenced on different scales by natural and man-made impacts, which change the medium state and lead as a result to a complicated many ranked hierarchic evolution. That is the subject of geo synergetics. Paradigm of physical mesomechanics, which was advanced by academician Panin V.E. and his scientific school, which includes the synergetic approach is a constructive method for research and changing the state of heterogenic materials [1]. That result had been obtained on specimens of different materials. In our results of research of no stationary geological medium in a frame of natural experiments in real rock massifs, which are under high man-made influence it was shown, that the state dynamics can be revealed with use synergetics in hierarchic medium. Active and passive geophysical monitoring plays a very important role for research of the state of dynamical geological systems. It can be achieved by use electromagnetic and seismic fields. Our experience of that research showed the changing of the system state reveals on the space scales and times in the parameters, which are linked with the peculiarities of the medium of the second or higher ranks [2-5]. Results of seismological and electromagnetic information showed the mutual additional information on different space-time levels of rock massive state, which are energetic influenced by explosions, used in mining technology. It is revealed a change of nonlinearity degree in time of the massive state by active influence on it. The description of massive movement in a frame of linear dynamical system does not satisfy the practical situation.
The received results are of great significance because for the first time we could find the coincidences with the mathematical theory of open systems and experimental natural results with very complicated structure. On that base we developed a new processing method for the seismological information which can be used in real time for estimation of the disaster degree changing in mine massive.
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