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   Autore             Selzer Michael

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   Sommario/riassunto  In engineering work, the optimization of the microstructure of a
                      material, of mechanically loaded components and of components
                      influencing the flow behaviour is important. Understanding the
                      behavior of flows in geological structures can be used to optimize the
                      design of geothermal power plants. In this thesis, methods from
                      continuum mechanics, fluid mechanics and the phase field method are
                      presented for the optimization of such processes and examples of
                      optimizations are shown.