

## 坝址温度场与变物性渗流场全耦合分析

Fully- coupled analysis of temperature field and variable properties seepage field around dam- site

中文关键词: [坝址温度场和渗流场](#) [变物性](#) [耦合](#) [数值模拟](#) [FEMLAB](#)

英文关键词: [temperature field](#) [seepage flow](#) [dam- site](#) [variable properties of water](#) [coupled analysis](#) [numerical simulation](#) [FEMLAB](#)

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中文摘要:

在只考虑流体性质受温度的影响条件下,根据多孔介质渗透系数与温度之间存在的线性关系,利用相关数据,分析了渗流场对温度较为敏感的敏感性,从温度变化引起水的密度和黏度的变化来考虑温度场对渗流场的影响,建立了温度场和变物性渗流场的瞬态全耦合数学模型,并初步探讨了这种全耦合模型的求解思路,采用FEMLAB 软件,在原有模型的基础上做了二次开发,从而实现了该全耦合问题的有限元求解通过工程实例,对所建的坝址温度场与变物性渗流场全耦合模型做了数值验证,计算结果表明,采用全耦合模型求解渗流问题时,坝址区温度升高,渗流流速普遍降低;温度场变动比较小,而渗流场变动相对大一些。

英文摘要:

Under the condition of only the variations of water properties affected by temperature was considered, the characteristic of seepage flow that the flow field is sensitive to temperature field is analyzed based on the linear relationship between permeability coefficient of porous and temperature. On the assumption that the density and viscosity of water are closely related to temperature, a model for seepage field which fully couples the temperature field with the variable properties of water was established. A preliminary solving approach was also discussed. Based on the suggested model the software FEMLAB is applied to carry out the secondary development of the model to deduce the finite element solution of the fully- coupled analysis. The validity of the model is verified by numerical analysis result of an example. It is found that the calculated temperature around dam- site will be higher and the seepage flow velocity will be lower if the proposed model is adopted.

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