

Theory of Poroelasticity

Ki-Bok Min, PhD
Assistant Professor

Department of Energy Resources Engineering, Seoul National University

Reference list on elasticity, rock mechanics and poroelasticity

1. Classic books on elasticity

Timoshenko SP and Goodier JN, Theory of Elasticity, 3rd ed., McGraw-Hill, 1970 (a classic on elasticity)

Love AEH, A Treatise on the Mathematical Theory of Elasticity, 1st ed., Cambridge, 1893; 4th ed., Dover, 1944

Fung YC, Foundations of Solid Mechanics, Prentice-Hall, 1965

Chou PC and Pagano NJ, Elasticity: Tensor, Dyadic, and Engineering Approaches, Prentice-Hall, 1967, Dover, 1992 (This book focuses on deriving and setting up the equations, and on presenting general solution procedures, rather than on deriving specific solutions)

2. Books on general continuum mechanics

Fung YC, A First Course in Continuum Mechanics, Prentice-Hall, 1969

Mass GE, Schaum's outline series: Theory and problems of Continuum Mechanics, McGraw-Hill, 1970 (very condensed and gives a good summary, but may not be enough)

Malvern LE, Introduction to the Mechanics of a Continuous Medium, Prentice-Hall, 1969

3. Books on anisotropic elasticity

Lekhnitskii SG, Theory of Elasticity of an Anisotropic Elastic Body, Holden-Day, 1963 (a classic on anisotropic elasticity)

Ting TCT, Anisotropic Elasticity - Theory and Applications, Oxford University Press, 1996 (less known but gives a different perspectives)

4. Books on rock mechanics and related topics

Jaeger JG, Cook NGW and Zimmerman RW, Fundamentals of Rock Mechanics, 2007, 4th edition, Blackwell Publishing (highly recommended).

Hoek E and Brown ET, Underground Excavations in Rock, Inst Mining & Metallurgy, 1980 (a classic)

Hudson JA and Harrison JP, Engineering Rock Mechanics I, Pergamon, 1997 (provides a good perspective but full of typos)

Harrison JP and Hudson JA, Engineering Rock Mechanics Part II, Pergamon, 2000 (fun to read)

Hoek E, Kaiser PK and Bawden WF, Support of Underground Excavations in Hard Rock, Taylor & Francis, 2000

http://www.rocscience.com/Hoek/references/Support_of_Underground_Excavations_in_Hard_Rock.pdf (practical and useful)

Hoek E, Practical Rock Engineering, <http://www.rocscience.com/hoek/PracticalRockEngineering.asp> (practical and concise)

Brady BHG and Brown ET, Rock Mechanics for Underground Mining, 4th ed., Kluwer Academic Publishers, 2004 (excellent for mining application)
Goodman RE, Introduction to Rock Mechanics, 2nd ed. John Wiley & Sons, 1989 (a good and tested book)
Obert L and Duvall WI, Rock Mechanics and the Design of Structures in Rock, John Wiley & Sons, 1967 (many typos)
Pusch R, Rock Mechanics on a Geological Base, Elsevier, 1995 (emphasis on geology)

5. Books (resources) on poroelasticity (or poromechanics)

Wang HF, Theory of Linear Poroelasticity with Applications to Geomechanics and Hydrogeology, 2000, Princeton University Press (a useful book, poroelasticity became less difficult because of this book)

Detournay E and Cheng AHD, Fundamentals of Poroelasticity, In: Hudson JA (ed), Comprehensive Rock Engineering, 1993, Vol.2, 113-171 (<http://www.olemiss.edu/sciencenet/poronet/fundporo.pdf>, a long classic summary article in poroelasticity)

Gueguen Y and Bouteica M (eds), Mechanics of Fluid-Saturated Rocks, Elsevier, 2004 (should be a good publication, haven't checked in detail)

Zimmerman RW, Compressibility of Sandstones, Elsevier, 1991 (Prof Zimmerman's PhD thesis)

Coussy O, Poromechanics, 2nd Ed., Wiley, 2004 (highly theoretical)

Bai M and Elsworth D, Coupled Processes in Subsurface Deformation, Flow and Transport, ASCE Press, 2000 (not particularly reader-friendly)

<http://www.olemiss.edu/sciencenet/poronet/> (A website for poroelasticity maintained by Prof Cheng, one can subscribe to email list, approximately one email/week)

6. Other recent publications

Fjaer E et al., Petroleum-Related Rock Mechanics, Elsevier, 2nd Ed., 2008 (publication by a diligent group in Norway, a lot of experience, application to petroleum engineering)

Zoback MD, Reservoir Geomechanics, Cambridge University Press, 2007 (timely publication for petroleum/geothermal applications, mostly Zoback's group's work)

Jing L and Stephansson O, Fundamentals of Discrete Element Methods in Rock Engineering, Elsevier, 2007 (good summary for DEM)

Amadei B and Stephansson O, Rock Stress and Its Measurement, Chapman & Hall, 1997 (comprehensive and expensive)

- The list is inevitably biased but covers most of the important books.

- For the books that is not available, you are encouraged to order through SNU library. ₩400k/year for a graduate student.

8 March 2010