MASS AND HEAT TRANSFER

GeoEE 500

1. **Mass Transport in Saturated Media**
    - 1.1. Transport Mechanisms
        - 1.1.1. Diffusion
        - 1.1.2. Advection
        - 1.1.3. Mechanical Dispersion and Taylor Dispersion
        - 1.1.4. Hydrodynamic Dispersion
2. **Advection-Dispersion Equation**
    - 2.1. Energy Transport Analog
    - 2.2. Coupled Environmental Fluid Mechanics Equations
    - 2.3. Analytical Solutions
        - 2.3.1. 1-D Step Change in Concentration
        - 2.3.2. 1-D Continuous Injection
        - 2.3.3. 1-D Slug Injection
        - 2.3.4. 3-D Linear Transport – Slug Injection
    - 2.4. Evaluating Dispersion and Scale Effects
3. **Retardation and Attenuation**
    - 3.1. Sorption
    - 3.2. Equilibrium Surface Reactions
    - 3.3. Concepts of Retardation
        - 3.3.1. Porous Media
        - 3.3.2. Fractured Media
        - 3.3.3. Sorbed Mass Evaluation
    - 3.4. Retardation in Heat Transport
4. **Residence Time Distributions**
    - 4.1.1. Reactive Transport Behavior