



AD FALCON API Manual

Simulation Modes in Coupled & Fully-Coupled Analyses

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1 Simulation Modes in Coupled & Fully-Coupled Analyses

FALCON provides **three time-integration modes**—**Static**, **Consolidation**, and **Dynamic**—applicable to *uncoupled*, *coupled*, and *fully-coupled* formulations.

Each mode is obtained by selectively omitting inertia M'' and/or rate C' terms from the fully-coupled system; the same trimming rule is applied to whatever blocks (solid, water, air) exist in the chosen analysis type.

Mode	Retained physics	Typical use-case
Static	Stiffness only K, H	Equilibrium, static problems
Consolidation	Stiffness + damping (flow) C, H	slow phenomenon such as those involving drainage and slow pore water flow variations
Dynamic	Mass M + damping C + stiffness K (full system)	Seismic, impact, wave loading

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1.1 Coupling Overview

** Coupling Matrix**

Analysis Type	Solid	Water	Air
Uncoupled		—	—
Coupled			—
Fully Coupled			