A periodically forced circulation — review sheet

Use this after attempting the worked examples and practice. Explain each claim in words before calculating.

Key ideas

- A baseline records parameters, initial states, units, method and duration.
- Volume reconstruction uses Vd plus compliance at the saved phase times pressure.
- Internal flows cancel in the total-volume balance.
- Startup change, conservation residual and time-step error are different diagnostics.
- An implicit hydraulic step requires a coupled solve and valve consistency.

Common errors and repairs

Calling any changing waveform conservation drift. Compute the summed volume account and inspect cycle-to-cycle change separately.

Using seconds directly with flows in L/min. Convert the step to minutes before multiplying flow.

Treating Rs=8 and Rs=17.86 as the same baseline. Record parameter identity and label new choices explicitly.

Retrieve without your notes

- How long is a beat at 80 beats/min?
- Does conservation prove the waveform is accurate?

Readiness check

- Identify six pressure states, six stored volumes, four ideal valves and two vascular beds in the supplied baseline.
- Convert the seconds-based interface to minute-based hydraulic increments.
- Reconstruct total volume from phase-dependent compliance, pressures and unstressed volumes.
- Distinguish startup transients, conservation drift and time-step error.
- Implement a volume audit and report the evidence needed before interpreting a parameter change.