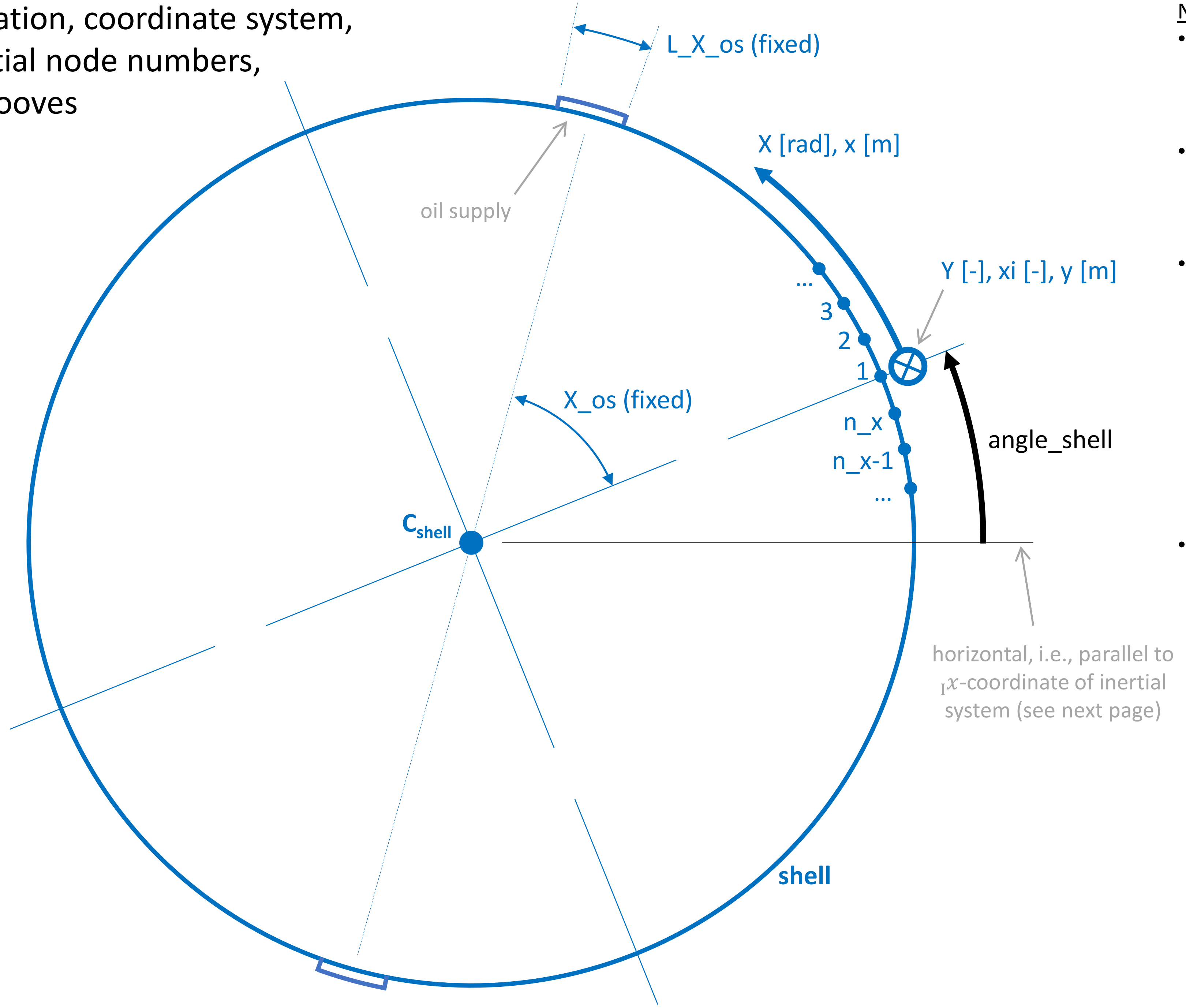
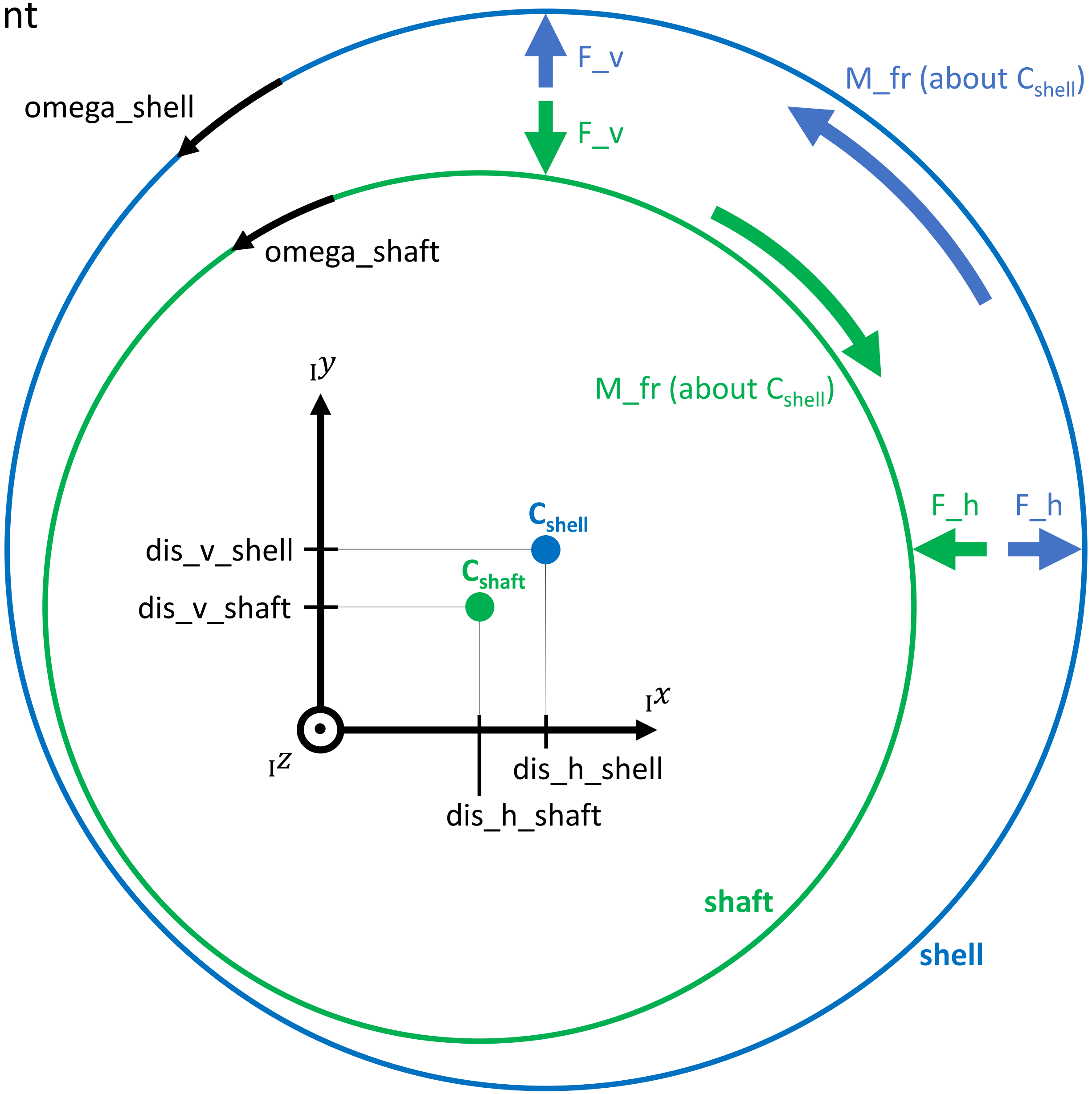
Shell: orientation, coordinate system, circumferential node numbers, oil supply grooves



<u>Notes</u>

- Any number of oil supply grooves is allowed (here, 2 are displayed, exemplarily), but the program assumes them to be distributed equidistantly around the circumference.
- The displayed circumferential node numbers are important for the input/output of certain nodal quantities stored in arrays (e.g., ac_vec or mu_vec).
- The displayed coordinate system is fixed in the reference frame of the shell. It's origin lies in the axial midplane of the bearing, meaning that the coordinate y ranges from -l_b/2 to l_b/2, where l_b is the axial length of the bearing. Radially, the origin lies exactly at the shell surface, although it isn't exactly illustrated that way (in the illustration, the origin has been shifted further outward, to make room for the depiction of the nodes).
- The nondimensionalized coordinates Y and xi are defined as Y=y/r_b and xi=2*y/l_b, where r_b is the bearing radius. The nondimensionalized coordinate X is defined as X=x/r_b.

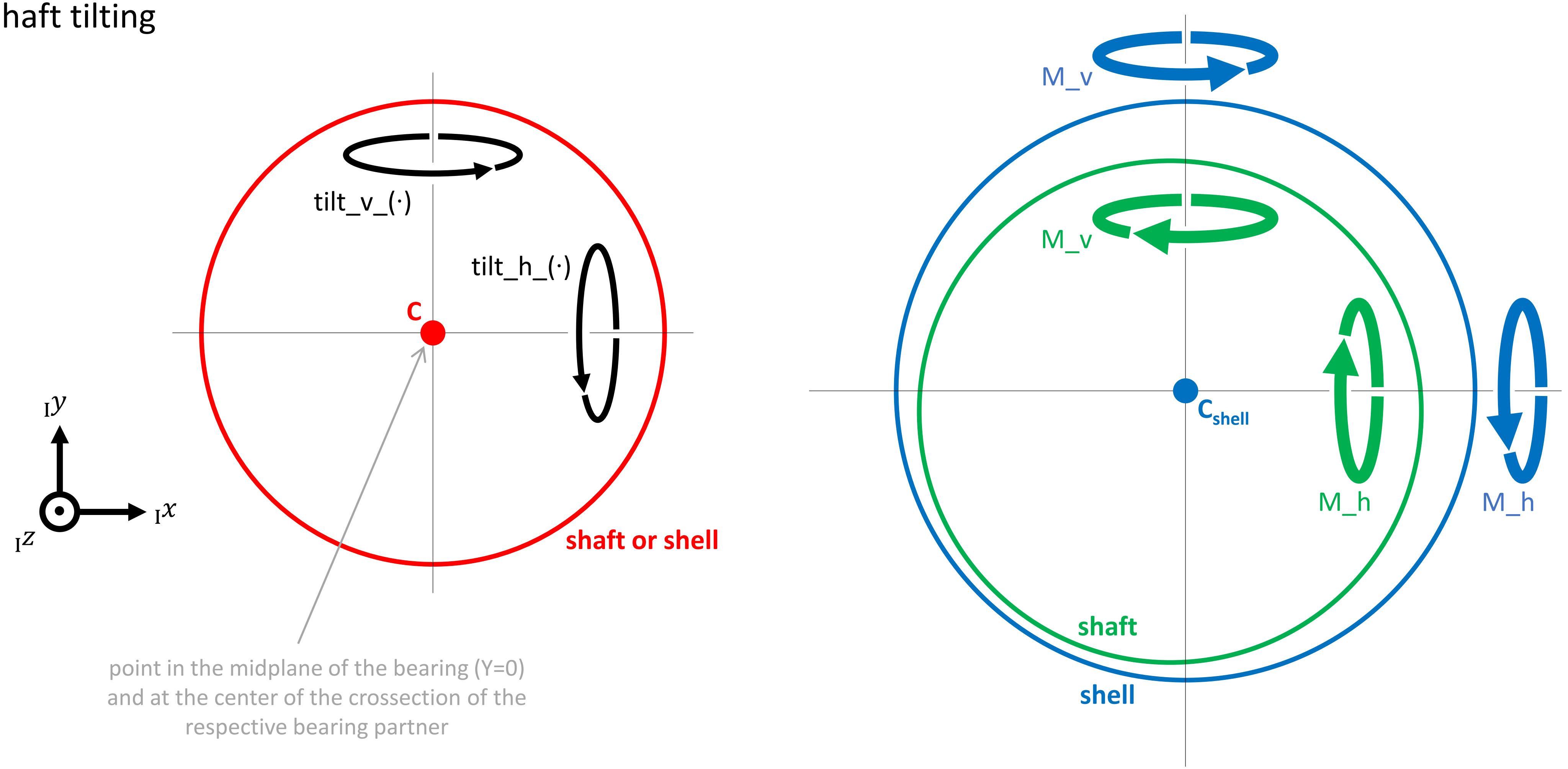
Section through the midplane of the bearing, kinematic variables, hydrodynamic forces, friction moment



Notes

- The coordinates $\{{}_{I}x, {}_{I}y, {}_{I}z\}$ represent the inertial system of your choosing (not to be confused with x and y on the previous page).
- The program expects the kinematic variables omega_(·), dis_(·), and vel_(·) as inputs, where vel_(·) is the rate of change of dis_(·).
- The hydrodynamic forces F_(·) and the friction moment M_fr are outputs.

Shaft tilting



Notes

- The influence of the shaft tilting inside the bearing on the gap geometry (and, thus, on the hydrodynamic forces and moments) is not considered in the semi-analytical solution (SBFEM) but only in the numerical solution (here interpreted as FVM).
- The tilting motion is described by two small tilting angles about a horizontal and a vertical axis, namely tilt_h_(·) and tilt_v_(·), respectively, and by their rates of change, namely tilt_dot_h_(·) and tilt_dot_v_(·), respectively. Note that these rates of change aren‘t necessarily equal to the body‘s angular-velocity components about these space-fixed axes, as said angular-velocity components are affected also by the fast rotation of the tilted body about its own body-fixed longitudinal axis.
- The angles tilt_(·) and their rates of change tilt_dot_(·) are input variables; the hydrodynamic moments M_(·) are output variables.