z_r

blade reference frame

y_r

airfoil

beam local frame

nondimensional
pitch axis location

z_l

y_l

beam local frame (cbm frame)

x_l

blade reference axis

twist

beam reference axis

x_r

chordline

a) arbitrary beam reference axis

z_r

blade reference frame

y_r

airfoil_position

z_l

y_l

x_l

x_r
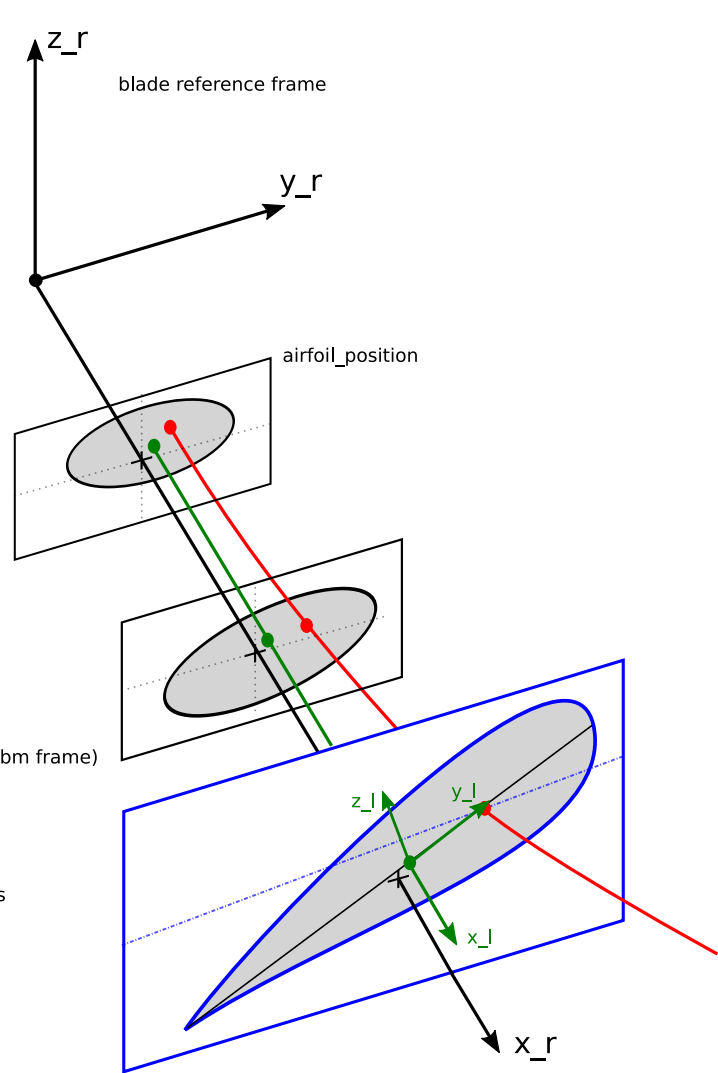
b) beam reference axis parallel to x_r