Moment of inertia stuff

Here are the definitions of the various moments of inertia. The function ρ is the density and R is a region in three-space.

$$I_{xx} = \iiint_R \left(y^2 + z^2\right) \rho(x, y, z)\, dV$$

$$I_{yy} = \iiint_R \left(x^2 + z^2\right) \rho(x, y, z)\, dV$$

$$I_{zz} = \iiint_R \left(x^2 + y^2\right) \rho(x, y, z)\, dV$$

$$I_{xy} = -\iiint_R xy\rho(x, y, z)\, dV$$

$$I_{xz} = -\iiint_R xz\rho(x, y, z)\, dV$$

$$I_{yz} = -\iiint_R yz\rho(x, y, z)\, dV$$

The first one, I_{xx}, is the moment of inertia of R around the x-axis when R is rotated about the x-axis. I_{yy} and I_{zz} can be interpreted similarly. I_{xy} is the moment of inertia around the y-axis when R is rotated about the x-axis. Again, there are similar interpretations for I_{xz} and I_{yz}. The book probably neglects to define the mixed moments because one can always choose coordinates so that all of the mixed moments of inertia are zero.