Angular Momentum of the Human Body

$$\mathbf{H}_G = \sum_{i=1}^{14} \mathbf{H}_i$$

where, $\mathbf{H}_G$ is the angular momentum of the human body about an axis passing through the c.g. (G) of the entire body

$\mathbf{H}_i$ is the angular momentum of each segment of the about an axis passing through the c.g. (G) of the entire body

i is the segments (there are 14 segments in a model of the human body)

To compute $\mathbf{H}_i$ for each segment, you must compute two terms:

A. Local angular momentum - $\mathbf{H}_{local}$

$$\mathbf{H}_{local} = I_{seg}\ \boldsymbol{\omega}_{seg}$$

where, I_{seg} is the moment of inertia of the segment about an axis parallel to the axis of rotation and that passes through the c.g. of the segment. The axis of rotation is the axis through G that the entire body is rotating about.

$\boldsymbol{\omega}_{seg}$ is the angular velocity of the segment

B. Transfer angular momentum - $\mathbf{H}_{transfer}$

$$\mathbf{H}_{tranfer} = \mathbf{r}_{seg/G}\ \mathbf{x}\ (m_{seg}\ \mathbf{v}_{seg/G})$$

where, $\mathbf{r}_{seg/G}$ is a vector that points from G to the c.g. of the segment

m_{seg} is the mass of the segment

$\mathbf{v}_{seg/G}$ is the linear velocity of the c.g. of the segment relative to G

x indicates the cross product operation

Thus,

$$\mathbf{H}_G = \sum_{i=1}^{14} \mathbf{H}_i = \sum_{i=1}^{14} (\mathbf{H}_{local(i)} + \mathbf{H}_{transfer(i)})$$