Adaptive mechanisms in gaze control
Facts and theories

Eds. Berthoz & Melvill Jones

Chapter 19

Tensorial aspects of the multidimensional approach to the vestibulo-oculomotor reflex and gaze

A. Pellionisz

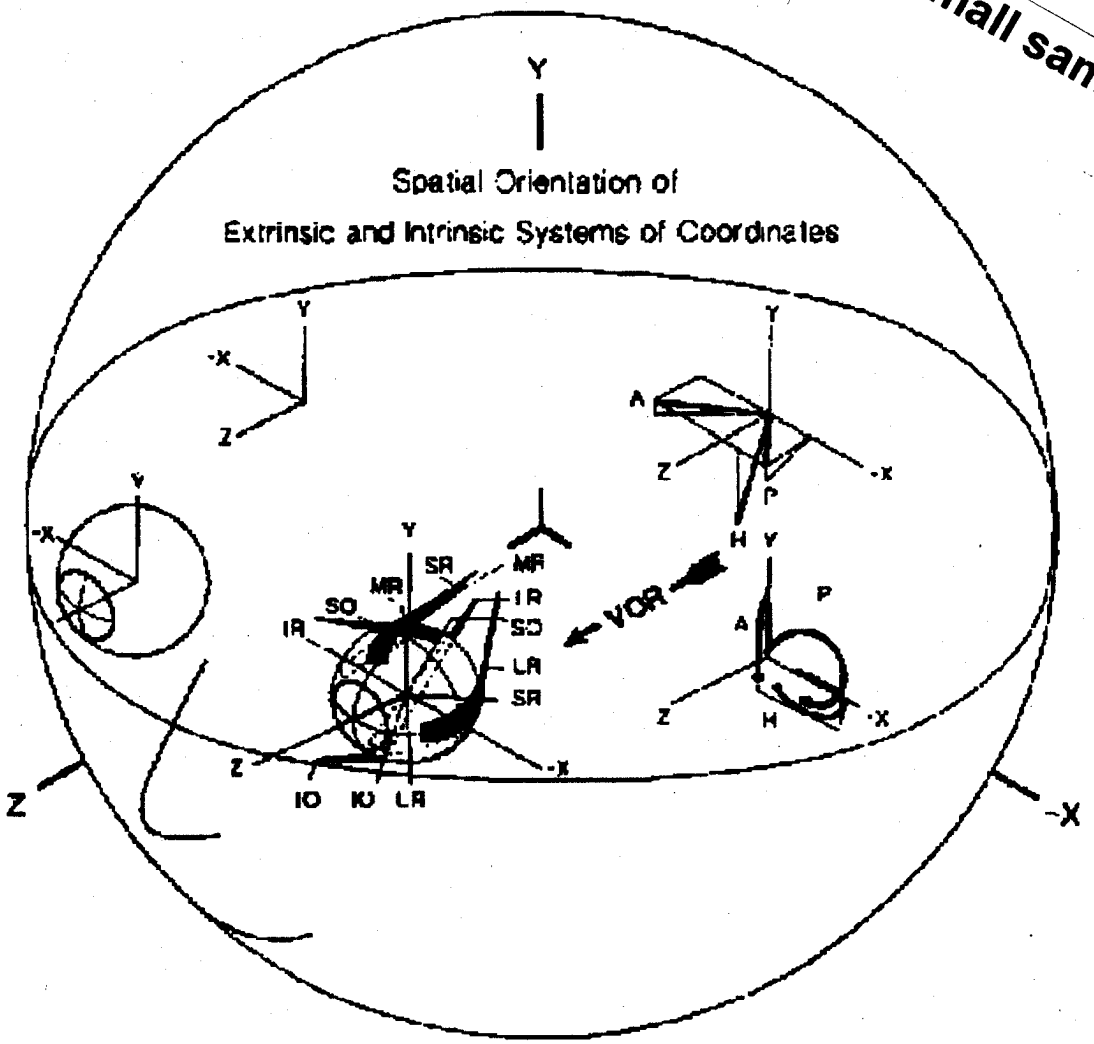

Fig. 1. The two kinds of coordinate systems, used in the external description and in the inner workings of the vestibuloocular reflex (VOR). Extrinsic, yet biologically oriented mirror-symmetric XYZ Cartesian frames (for the lateral sides of the body) are used as medial, dorsal and anterior, respectively. As in biological organisms with lateral symmetry, righthand rule applies to the right side, and left to the left-side. The `standard' position for visual demonstration presents XYZ with equal axes, 120° apart. Semicircular canals represent the HAP intrinsic system of vestibular coordinates, marked as: H, horizontal; A, anterior; and P, posterior. Eye muscles and their corresponding eye-rotational axes are denoted by: LR, lateral rectus; MR, medial rectus; SR, superior rectus; IR, inferior rectus; SO, superior oblique; IO, inferior oblique. These abbreviations apply throughout the paper. The diagram of the eye muscle orientation is drawn with the utilization of the computer model by Ostriker et al. 1985, and therefore both the paired sensory and unpaired motor systems are shown in a quantitatively exact manner.