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Presentation

Check preference: poster
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Theme and Topic

See list of themes and topics. Indicate below one theme and one topic appropriate for programing and publishing your paper.

Theme letter: G Theme title _____
Motor syst. & Sensorim. Int.
Topic number: 121 Topic title _____
Cerebellum

Special Requests (e.g., for projection and sequential presentations)

16 mm silent movie projector required

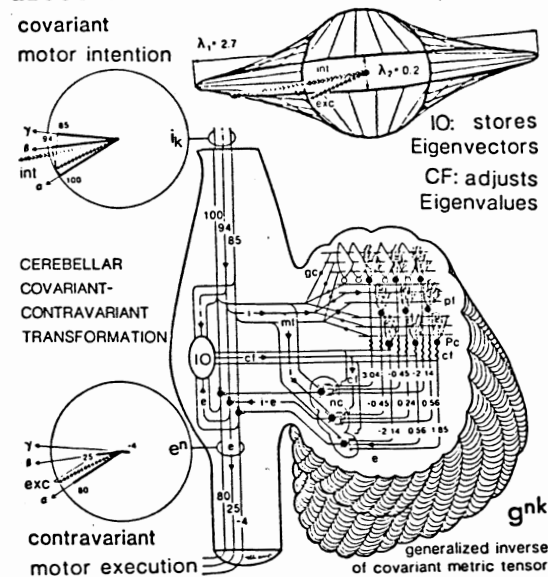
Include nonrefundable ABSTRACT HANDLING FEE of \$15, payable to the Society for Neuroscience, DRAWN ON A U.S. BANK IN U.S. DOLLARS ONLY.

TENSORIAL COMPUTER MOVIE OF THE GENESIS AND MODIFICATION OF CEREBELLAR NETWORKS AS DYADIC EXPANSIONS OF THE EIGENVECTORS STORED IN THE INFERIOR OLIVE. A. Pellionisz, Dept. Physiol. & Biophys., N.Y.U. Med. Ctr, 550 1st Ave, New York, NY 10016.

Cerebellar (CB) function is interpreted in tensor theory of the CNS (Pellionisz and Llinas [P&L] 1979) as a geometric transformation of covariant motor intention vectors into contravariant motor execution, that enables a coordinated action (P&L 1980). Such a metric function occurs in a curved spacetime manifold (P&L 1982), thus requiring a CF system that in effect makes the metric to be position-dependent in the state-space. Developmental changes of the structure of the organism show even more obviously that a metric-type network, whose functional geometry is to match the physical geometry of the executor system, must evolve and adapt suitably to the ever-changing status (L&P 1984).

Metaorganization, by which a geometry, eg. in the physical space, can mold another which is expressed in a different space, e.g. in a functional hyperspace (Pellionisz 1983, 1984, P&L 1984), explains how such network-properties may emerge.

Figure 1. after P'84



Metaorganization is based on finding eigenvectors in one system, and composing from them a matching (duplicate or complementary) geometry. In keeping with the view on oscillatory properties (Llinas '84) it is suggested that the eigenvectors found by covariant to contravariant reentry, are implemented in the inferior olive (IO), setting the principal directions of the tensor-ellipsoid of the CB metric network. Climbing fibers (CF) then carry them to CB nuclei, both directly and via the

Purkinje cells. Their convergence imprints the eigendyadic spectral representation of the required network, (generalized) inverse of the covariant metric g^{kn} , regardless of overcompleteness. Subsequent CF signals, reporting on errors of g^{kn} , adjust the eigenvalues, ie. the lengths of the ellipsoid-axes. The procedure of network-organization is demonstrated by a computer movie. -Suppt: USPHS NS13742-

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Pellionisz, A. (1984) Tensorial Computer Movie of the Genesis & Modification of Cerebellar Networks as Dyadic Expansions of the Eigenvectors Stored in the Inferior Olive. Soc. Neurosci. Absts. 10, p. 540

Dr. Andras J. Pellionisz (212) 340-5422

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Tensorial Computer Movie of the Genesis and Modification of Cerebellar Networks as Dyadic Expansions of the Eigenvectors Stored in the Inferior Olive. A. Pellionisz, Dept. Physiol. & Biophys., N.Y.U. Med. Ctr, 550 1st Ave, New York, NY 10016.

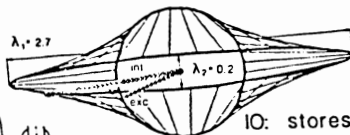
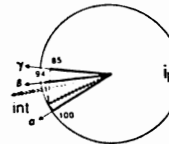
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Figure 1. after P'84

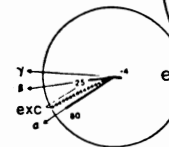
Setting the Geometry of the Cerebellar Tensor-Ellipsoid

covariant motor intention

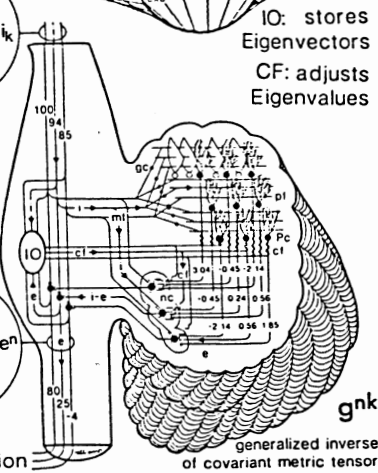


IO: stores Eigenvectors
CF: adjusts Eigenvalues

CEREBELLAR COVARIANT-CONTRAVARIANT TRANSFORMATION



contravariant motor execution



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