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ADVANCED NUMERICAL-ANALYTICAL METHODS FOR INTERNAL S.ALBEVERIO PATH-INTEGRAL EVOLUTION OF CHAOS EMBEDDED IN NOISE.

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A global theory of neocortical dynamic function at macroscopic scales was developed to explain salient features of electroencephalographic(EEG) data recorded from human scalp [1]. In some limiting cases, the theory predicts EEG standing wav es composed of linear combinations of spatial modes. These modes (which may be called order parameters in the parlance of modern dynamical methods) are governed by linear or quasilinear ordinary differential equations [1-3]. These data and theoretical works suggest several connections to reports of chaotic attractors estimated for EEG data [1]. In order to illuminate possible relations between sub-macroscopic chaos (for example in neocortical columns) and large scale data observed at the scalp, we suggested a simple metaphoric system, the linear stretched string with nonlinear attached springs [4-6]. We hav e studied a forced partial differential equation describing the string-spring system, where the forcing term might represent a steady-state evoked potential in the neocortical analogy. In the limiting case when string tension is zero, the forced Duffing equation is obtained. The Duffing equation exhibits a rich dynamic behavior of periodic and superchaotic motion, for different parameters (associated with different wav e numbers in the string-spring system).

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