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Time evolution of the action potential by the fourth-order Runge-Kutta method

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We reconsider the case of an action potential propagating steadily along a uniform length of axon. Having adopted the well-known Hodgkin-Huxlay set of differential equations, their analytical and numerical investigation is carried out in order to give a more quantitative picture of the sequence of events during the impulse. The calculated via forth-order Runge-Kutta algorithm variation of sodium and potassium conductance, accompanying the theoretically evaluated propagation of action potentials, is presented. An explicit analytical and numerical solution of the Hodgkin-Huxlay system is broadly outlined.