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A cable model for coupled neurons with somatic gap junctions. (English) Zbl 1101.92008
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Summary: A cable model is presented for a pair of electrotonically coupled neurons to investigate the spatial effects of soma-somatic gap junctions. The model extends that of *R. R. Poznanski* et al. [Bull. Math. Biol. 57, No. 6, 865–881 (1995; [Zbl 0835.92009](#))] in which each neuron is represented by a tapered equivalent cable attached to an isopotential soma with the two somas being electrically coupled. The model is posed generally, so that both active and passive properties can be considered. In the active case a system of nonlinear integral equations is derived for the voltage, whilst in the passive case these have an exact solution that also holds for inputs modelled as synaptic reversal potentials. Analytical and numerical methods are used to examine the sensitivity of the soma potentials (in particular) to the coupling resistance.

MSC:

[92C20](#) Neural biology
[92C05](#) Biophysics
[45G10](#) Other nonlinear integral equations

Cited in 1 Document

Keywords:

[Green's function](#)

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References:

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