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***In Memoriam Adelina Georgescu***

# FOLDED SADDLE-NODES AND THEIR NORMAL FORM REDUCTION IN A NEURONAL RATE MODEL*

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**Abstract**

The paper investigates the existence of folded singularities in a dynamical system of two fast and two slow equations. The normal form of the system near its fold curve is constructed. Then it is used to determine the analytical conditions satisfied by a folded singularity. In particular, we find that there is a parameter region where folded saddle-nodes of type II exist. In the neighborhood of those points the system possesses a stable folded node and an unstable true equilibrium, and the local dynamics is complex.

**MSC 2010:** 37G05, 34E13, 92C20

**keywords:** inhibitory neural networks, folded singularities, canards

## Foreword

This work is a tribute to my mentor, Professor Dr. Adelina Georgescu.

I met Dr. Georgescu at the beginning of the year 1997, in Bucharest, Romania. At that time she was the Director of the Institute of Applied Mathematics of the Romanian Academy, and she was very busy reorganizing

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