

Preface

This text sprung from a course we have taught jointly over the last 8 years at Rice University to students from Rice and Baylor College of Medicine. The goal of our course, and this text, is to develop mathematical methods that are most relevant to neuroscience, in a fashion that deepens the student's knowledge of each.

Regarding the mathematics, this means working in concrete incremental steps that enable the student to parse and extend the MATLAB code provided for each of the 232 computational examples and exercises. Regarding the neuroscience, this means establishing basic models of stimuli and molecular, cellular, and circuit level phenomena prior to their systematic elaboration and integration. The degree to which we have succeeded in this goal is, in large measure, due to the perspicacity of our many devoted students.

We have also benefited from Houston's rich neuroscience climate and happily acknowledge the leadership of Jack Byrne, Mike Friedlander, Marty Golubitsky,

and Kathy Matthews in promoting dialog between mathematics and neuroscience. This dialog has been sustained by our close collaboration with fellow members of the Gulf Coast Consortium for Theoretical and Computational Neuroscience. In particular, we thank Mark Embree, Kreso Josic, Weiji Ma, Peter Saggau, and Harel Shouval for detailed feedback on a number of our chapters. It is also a pleasure to acknowledge comments received from Maurice Chacron, Stephen Coombes, Greg DeAngelis, Brent Doiron, Hans van Hateren, Leonard Maler, Victor Matveev, and Ralf Wessel and his group.

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