Pattern formation in the bistable Gray-Scott model

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The paper presents a computer simulation study of a variety of far-from-equilibrium phenomena that can arise in a bistable chemical reaction-diffusion system which also displays Turing and Hopf instabilities. The Turing bifurcation curve and the wave number for the patterns of maximum linear growth rate are obtained. The distribution in parameter space of a wide variety of different spatio-temporal attractors that can be reached through a strong local perturbation of the linearly stable homogeneous steady state is mapped out. Special emphasis is given to the newly discovered spot multiplication process in which cell-like structures replicate themselves until they occupy the entire system.

General information
State: Published
Organisations: Department of Physics
Contributors: Mazin, W., Rasmussen, K., Mosekilde, E., Borckmans, P., Dewel, G.
Pages: 371-396
Publication date: 1996
Peer-reviewed: Yes

Publication information
Journal: Mathematics and Computers in Simulation
Volume: 40
Issue number: 3-4
ISSN (Print): 0378-4754
Ratings:
BFI (2019): BFI-level 1
Web of Science (2019): Indexed yes
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 1.68 SJR 0.613 SNIP 1.226
Web of Science (2017): Impact factor 1.476
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 1.43 SJR 0.562 SNIP 1.095
Web of Science (2016): Impact factor 1.218
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 1.29 SJR 0.671 SNIP 1.086
Web of Science (2015): Impact factor 1.124
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 1.27 SJR 0.549 SNIP 1.12
Web of Science (2014): Impact factor 0.949
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 1.16 SJR 0.569 SNIP 1.04
Web of Science (2013): Impact factor 0.856
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 1.11 SJR 0.589 SNIP 1.011
Web of Science (2012): Impact factor 0.836
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): CiteScore 1.21 SJR 0.577 SNIP 1.08
Web of Science (2011): Impact factor 0.738
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.722 SNIP 0.81
Web of Science (2010): Impact factor 0.812
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.459 SNIP 0.991
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 0.518 SNIP 0.855
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 0.456 SNIP 0.924
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 0.267 SNIP 0.852
Scopus rating (2005): SJR 0.364 SNIP 0.79
Scopus rating (2004): SJR 0.336 SNIP 0.933
Web of Science (2004): Indexed yes
Scopus rating (2003): SJR 0.29 SNIP 0.825
Scopus rating (2002): SJR 0.341 SNIP 0.582
Web of Science (2002): Indexed yes
Scopus rating (2001): SJR 0.31 SNIP 0.629
Web of Science (2001): Indexed yes
Scopus rating (2000): SJR 0.236 SNIP 0.535
Web of Science (2000): Indexed yes
Scopus rating (1999): SJR 0.206 SNIP 0.398
Original language: English
Source: orbit
Source-ID: 167012
Research output: Research - peer-review › Journal article – Annual report year: 1996