

MATH 553 (Advanced Dynamical Systems)

Course Outline

Session 2016W Term 2 (Jan–Apr 2017)

Prerequisite: MATH 552 (or equivalent)

Web page: <http://www.math.ubc.ca/~nagata/m553/>

Instructor: Wayne Nagata (email: nagata@math.ubc.ca, office: Mathematics 112, telephone: 604-822-2573)

Recommended textbook (optional, not required):

- Y. A. Kuznetsov, *Elements of Applied Bifurcation Theory*, Springer, New York (3rd ed. 2004).

Topics:

- *Topics in Global Dynamics*: The Smale horseshoe map, symbolic dynamics, chaos, bifurcations of orbits homoclinic to hyperbolic equilibria (chaos in Lorenz equations, Shil'nikov bifurcations).
- *Two-Parameter Bifurcations of Equilibria*: Codimension two bifurcations, cusp bifurcation, generalized Hopf (Bautin) bifurcation, Bogdanov-Takens bifurcation, fold-Hopf bifurcation.
- *Homoclinic Bifurcations in n Dimensions*: Homoclinic orbits in $\mathbb{R}^n$, projections, exponential dichotomies, homoclinic centre manifolds.
- *Travelling Waves in Reaction-Diffusion Equations*: Reaction-diffusion equations, travelling wave solutions, stability of travelling waves.