

Homework No.8, 550.391, Due November 18, 2011.

1. Strogatz, Problem 8.1.7.
2. Strogatz, Problem 8.1.11.
3. Strogatz, Problem 8.2.1.
4. Strogatz, Problems 8.2.2 and 8.2.3.
5. Strogatz, Problem 8.3.1.
6. Strogatz, Problem 8.4.2.
7. Strogatz, Problem 8.4.3.
8. Strogatz, Problem 8.6.2.

In part (b) of this problem, the quantity which is conserved depends explicitly on time. Such quantities are often called “quasi-conserved”. To solve part (d), Section 4.3 of Strogatz is useful and also eq.(10) of Section 4.6. It will help to rewrite θ_1 and θ_2 in terms of the sum and difference variables $\theta_1 + \theta_2$ and $\theta_1 - \theta_2$ and to consider the dynamical equations for those variables instead. Notice that the answer to Problem 8.6.2 is in the back of Strogatz’ book, so that you can check your final answer. Interpret the results in physical terms for both strong coupling $|2a| > |1 - \omega|$ and weak coupling $|2a| < |1 - \omega|$ of the oscillators.