

Math 587 - Take-Home Final

Choose one problem (I, II or III) to do from those listed below (unless we have discussed doing an alternative problem). The solutions should be turned in, to me, by Thursday, December 17.

I. *Spontaneous Excitation of a Mean Flow* (Section 10.1.2 of the text (Miller))
Do Exercise 10.5

II. *Multiple Wave Resonances* (Section 10.1.3 of the text (Miller))

Do Exercises 10.6 and 10.9 (for the case of $N = 3$)

See also A. Craik, *JFM* (1971), vol. 50, part 2, pp. 393-413

and P. Drazin **Hydrodynamic Instability** (1981) [Section 51]

III. *Long Wave Asymptotics* (Section 10.1.4 of the text (Miller))

Do Exercises 10.10 and 10.11

General Background Source: **Linear and Nonlinear Waves**, G.B. Whitham (1974)