

continued on back

GPP Problems

	11. I. 1a	15 pts	drift motion
	11. II. 3a	40 pts	plasma oscillations & Landau damping
	10. I. 1a	10 pts	plasma vs metal
✓	10. II. 2	40 pts	Vlasov → fluid
✗	10. II. 3a	40 pts	mirror; drift & trapping
✓	09. I. 6	10 pts	beam force balance, relativity
	09. II. 1	25 pts	particle dynamics
✓	09. II. 6	20 pts	fusion power maximization
✓ ✗	08. I. 1	40 pts	planar diode variant
	08. II. 3	30 pts	particle dynamics & radiation
✓	07. I. 2	35 pts	distribution function in cylinder
	07. II. 1	15 pts	power balance & drag; alphas
	06. I. 5	35 pts	energy cons. & Vlasov
	06. II. 3	40 pts	trapping & adiabatic invariants
✓	06. II. 5b	15 pts	frequency scalings
	05. I. 3	20 pts	MHD ordering & Transport coeffs
✓	05. II. 2	15 pts	drifts
	05. II. 7	25 pts	mirror: drifts & trapping
✓	04. I. 7	35 pts	particle dynamics, beam
✓	04. II. 1	15 pts	freq. scalings / bananas / adiabatic compress.
✓	04. II. 5	40 pts	planar diode variant
	03. I. 2	40 pts	particle dynamics cylinder
	03. II. 6	20 pts	single particle motion
toughy	02. I. 6	60 pts	trapping & collisions
	02. II. 4	25 pts	particle dynamics & radiation
✓	02. II. 6	10 pts	beam force balance relativity
	01. II. 4	30 pts	mirror trapping
	01. II. 6b	10 pts	distance scaling scaling

~~10. II. 3a~~

MHD Problems

✓	10.II.4	45 pts	MHD energy
✓	09.I.7	35 pts	stability & energy principle (E)
✓	09.II.4	15 pts	assumptions
✓	08.I.4	20 pts	safety factor
✓	08.II.5	40 pts	EP & helicity
✓	07.I.3	15 pts	islands & flux
✓	07.II.2	45 pts	stability & EP
✓	06.I.1	50 pts	islands & flux
✓	05.II.1	40 pts	energy
✓	04.I.6	15 pts	EP
✓	03.I.3	40 pts	flux surfaces
?	02.I.1	50 pts	equilibrium
?	01.I.7	10 pts	tearing modes
repeat	01.I.8	40 pts	EP
repeat	00.I.4	10 pts	flux
double	00.I.5	50 pts	linear stability
	11.II.16	20 pts	derive MHD eqs
	11.II.4	45 pts	confinement in toroidal field

Neoclassical Problems

✓	10. I. 4	60 pts	banana / P-SI plateau
✓	09. I. 5	45 pts	banana / Ware / resistivity / BS
✓	08. I. 3	40 pts	Ware & banana width
repeat	07. I. 5	35 pts	banana diffusion
✓	06. I. 3b	45 pts	bootstrap current
repeat	05. I. 4	45 pts	banana / Ware / bootstrap / resistivity
✓	04. I. 3	60 pts	resistivity & collision operator
✓	03. II. 2	20 pts	Ware
repeat	02. II. 5	20 pts	whole matrix
?	01. I. 3	40 pts	poloidal spin-down
repeat	00. I. 1	20 pts	bananas
	11. I. 4	60 pts	Transport matrix, drift waves

Waves Problems

✓	10.I.2	35 pts	Lowest Kinetic Approx
✓	10.II.1	15 pts	Electrostatic properties
✓	09.I.3	45 pts	cold wave derivation
	08.I.2	40 pts	cold fast waves, group velocity
✓	07.I.4	35 pts	cold/warm parallel waves
⊗	06.I.4	40 pts	cold electron cyclotron waves
Memoriz ²	06.II.5a	15 pts	group velocity; energy flux
✓ ⊗	05.II.3a	10 pts	HHFW, wave ray tracing
✓	05.II.4	45 pts	hot parallel waves
✓	04.I.4	15 pts	ion acoustic waves
✓	04.I.5	20 pts	cold, multi-component plasma
✓	03.I.4	30 pts	lower hybrid wave
✓	03.I.5	20 pts	Bernstein wave
✓	02.I.4a	15 pts	cutoff density
✓	02.I.4b	15 pts	group velocity; electrostatic
✓	02.II.7	50 pts	transverse, longitudinal, ion acoustic
✓	01.I.6a	10 pts	cold, fast magnetosonic, multi-component
✓	01.I.6b	10 pts	electrostatics & damping
⊗	01.II.5	35 pts	hot electrostatic waves
✓	01.II.6a	10 pts	Alfven & acoustic waves
	00.I.7b	40 pts	ion acoustic & Landau damping
	00.II.3	45 pts	Bernstein wave
	00.II.6a	15 pts	density & O-mode
	01.I.1	35 pts	Two-Stream Instab.
	11.I.2	45 pts	dispersion rel. w/o Vlasov Eq.
	11.II.2	30 pts	X-mode resonance & polarization

Computational Problems

10. II. 3b	40 pts	2D diffusion, stability
09. II. 3b	40 pts	1D, advection, consistency, stability
08. I. 5b	40 pts	1D, diffusion, consistency, stability
07. I. 6b	40 pts	1D, advection Wendroff, trunc, stab
06. I. 3a	45 pts	1D, vector diffusion, form method
03. II. 1a	45 pts	1D, advection, conservative
11. II. 3b	40 pts	1D, diffusion, stability

Asymptotics Problems

	11. I. 1b	15 pts	$\psi = e^S$
	11. I. 5b	40 pts	Solutions to DE (homo)
✓	10. I. 2B	10 pts	Kruskal-Newton
✓	10. I. 5B	50 pts	Solutions to Diff Eq. (homo)
	09. I. 2	10 pts	WKB flux
	09. II. 3A	40 pts	Solutions to Diff Eq. (homo)
	08. I. 5A	40 pts	Solutions to Diff Eq. (homo)
	07. I. 6A	40 pts	Solutions to Diff Eq. (inhomo, maybe WKB)
✓	06. II. 4	30 pts	Solutions to Diff Eq. (homo)
B?	05. I. 1	40 pts	" " " " (homo)
✓	04. II. 4	50 pts	" " " " (homo)
✓	03. I. 6	15 pts	evaluation of integral \int
✓	03. II. 5	30 pts	WKB-bound state
	02. I. 2	15 pts	Solutions to Diff Eq. (inhomo)
✓	02. II. 3	10 pts	evaluation of integral
✓	01. I. 2	15 pts	WKB
✓	01. II. 2	10 pts	Solutions to Diff Eq. (inhomo)
	00. I. 8	15 pts	WKB scattering

topics: Kruskal Newton

Homogeneous Diff Eqs. : Ordinary

Regular

Irregular

Inhomogeneous Eqs.

WKB

Integral Solutions

Integral Evaluation

Boundary Layer

Exp/Diag Problems

	11. I. 3	20 pts	Thomson scattering cross-section
	11. I. 5a	40 pts	Langmuir probe characteristic
✓	10. I. 3	25 pts	Langmuir probe & secondary emission
exp	10. I. 5a	50 pts	Paschen curve
dumb	09. I. 4	20 pts	pressure gauges
✓	09. II. 5	40 pts	interferometer & double langm.
exp	08. II. 1	40 pts	freq measurements: Lang, capac, Mirnov
✓	08. II. 2	35 pts	Langmuir probe characteristic interferometer
 			
✓	07. I. 1	20 pts	Langmuir: single, double, triple
exp	07. II. 4	55 pts	interometer experiment
✓	06. I. 2	10 pts	tokamak
○	06. II. 2	45 pts	langmuir probe: multiple population
✓	05. I. 2	25 pts	langmuir probe characteristic
✓	05. II. 5	20 pts	Thompson scattering
repeat	05. II. 6	25 pts	langmuir: secondary emission
repeat	04. I. 1	25 pts	interferometer + vibrations
repeat	04. I. 2	10 pts	double langmuir probe
exp	04. II. 3	25 pts	any lab in detail
✓	03. II. 1b	45 pts	langmuir; ion temp measure
repeat	03. II. 3	20 pts	interferometer + vibrations
X	02. I. 5	25 pts	optical depth
repeat	02. II. 2a	15 pts	langmuir characteristics
exp	02. II. 2b	15 pts	Paschen / plasma death / langmuir circ
exp	01. I. 5	10 pts	Paschen
	01. II. 3	45 pts	various
	00. I. 3	15 pts	?
	00. II. 5	15 pts	3 diags. OR interferometer
	00. II. 6	15 pts	interferometer or tokamak

Irreversibles Problems

10. II. 5	40 pts	turbulent diffusion
09. I. 1	15 pts	velocity diff. coeff
09. II. 2	40 pts	electric potential fluctuations
08. II. 4	35 pts	Langevin \rightarrow F-P \rightarrow conservation law
07. II. 3	20 pts	gyrokinetics
07. II. 5	45 pts	potential fluctuations from impurity
06. II. 1	50 pts	Chapman Enskog & flows
05. I. 5	50 pts	Chapman Enskog
05. II. 3b	10 pts	friction force (methods)
04. II. 2	50 pts	dielectric, finite disp thm, conductivity
03. I. 7	20 pts	two fluid eqs, eigenmodes
03. II. 4	45 pts	viscosity (heuristic & quant)
02. I. 3	15 pts	spatial diffusion by mag field fluct
02. II. 1	50 pts	collision op. approx & friction forces
01. I. 4	20 pts	Braginskii thermal conductivities
01. II. 1	50 pts	Last HW assignment
00. I. 6	10 pts	diffusion basics
00. I. 7a	40 pts	\perp resistivity
00. II. 4	55 pts	Hasegawa-Mima + Langevin \rightarrow F-P
11. II. 1a	20 pts	dist. func. of reflected ions
11. II. 5	45 pts	???