Teaching plasma physics with computational physics SCOTT
ROBERTSON, University of Colorado — A senior level course in either plasma
physics or in numerical methods may not interest enough students to satisfy
The Dean, however, a combined course of one-semester has been found to gen-
erate sufficient enrollment. Plasma physics is particularly well-suited for mar-
riage with numerical methods, however, a combined course requires omitting
some plasma physics topics. The computational part of the course uses Math-
cad, an easy-to-learn spreadsheet. The students download numerical routines
(http://debye.colorado.edu/phys4150) that plot potential contours and field lines,
follow particle trajectories in magnetic fields, find roots of dispersion relations, evalu-
ate dispersion functions, and the students see more advanced routines for the sheath
and presheath, the Fokker-Planck equation, WKB ray tracing, and the Vlasov equa-
tion. The course follows F. F. Chen's text and the computational part of the home-
work often requires applying the written routines in new ways.

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