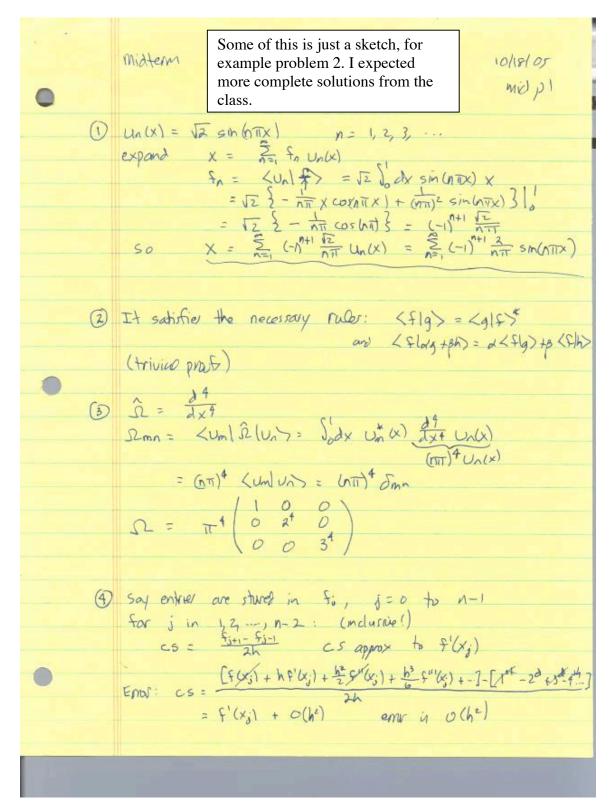
Midterm Solution PHZ 5156, Computational Physics October 18, 2005



10/18/05 mid pz 6) Euler needs 2 ~ Imax evalue / -98 Approximate the evaluer: $A \approx (99 199)$ $\begin{vmatrix} -98 - \lambda & -198 - 1 \\ -98 - \lambda & -198 - 1 \\ -99 199 - \lambda \end{vmatrix} = 0 = -(98 + \lambda)(199 - \lambda) + 99(198)$ 0 = (2+98)(2-199) + 99(198) 0 = 12 \$ -1011 - 19502 + 19602 $0 = \lambda^2 - 101 \lambda + 100$ 1=1,00 0 = (A-100)(A-1) Need E = about the 22.02 To go t=0 to 1000 would take at last .000 = 5000 seph This is a somewhood stiff problem. Better to we a more stable algorithm such as aderit. (b) E = - J Z Sij (Siply - Siml, j + Sijpl + Sijml) Initialize away 5 + every E + tempT > Do many sweep spun are nº steps: Pick site (i,j) at vardam Colculate $\Delta = -2 \cdot (Ed dute) = -2(-5) Sij (above)]$ IF ASO: Flip Sij=-Sij, E-E+A IF \$ >0: calculate random W in 0 to 1 If e^{A/k_BT} W, Slip sij=-sij, E=E+D Repeat store every at end of sweep. - Repead

10/18/05 p3 the type of quantity you calculate is an average, e.g. "Eave = (avoag are all but 1st church of swape) The envs goes as If sweet are which you average and also depends on tamp - e.g. is higher ver Te. () drx = - 7 cox - 3 dx (sin(3x)) \$= 2 X (6) =1 X,V VH) = off and Put Y = dy = (dx/dt) = dx/dt =(12×/012) = Then (-700 1x-31x | sin(3) make This fly) step so It = fly) def rhs(y): # Main code set up t=0, c, 22, ..., 8. y = (1., 2.) x, v = y(0), y(1)a = - 7 cosx - 3/V/ sin (3x) y = rkq(rhs, yd, t)return (v, a) plot del the teizet (f) : set up away y = 2 × #thing in t y[:, 0] = yd for yn= inc., n] , ---, len(t) -) h1= hz= h3= hy= y[:,n+1] =