Lecture 9 (2/7/05)

19. Gauge dependence of the solution.

20. Boundary conditions

Hyperbolic	Cauchy	open	$(\vec{\nabla}^2 - \partial_t^2)\psi(t,\vec{x}) = 0$
Elliptic	Dirichlet or Neuman	closed	$\vec{\nabla}^2\psi(\vec{x}) = 0$
Parabolic	Dirichlet or Neuman	open	$[\vec{\nabla}^2 - \frac{1}{\kappa}\partial_t + V]\psi(t,\vec{x}) = 0$

Radiation by moving Charges

1. Lienard-Wiechert Potentials (Jackson 14.1, pg.661)

$$A^\alpha = \frac{e}{4\pi}\frac{U^\alpha}{U^\nu(x_\nu - r_\nu(\tau_*))}$$

$$x^0 - r^0(\tau_*) = |\vec{x} - \vec{r}(\tau_*)|$$

2. Stress Energy Tensor (Jackson 12.10, pg. 605)

$$T^{\mu\nu} = -F^{\mu\gamma}F^{\nu}{}_{\gamma} + \frac{1}{4}g^{\mu\nu}F_{\alpha\beta}F^{\alpha\beta}$$