problem 1:

$\Lambda_{ij,lk} \quad D_{ij} D^*_{lk}$

$\Lambda_{ij,lk} = P_{il} P_{jk} - \frac{1}{2} P_{ij} P_{lk}$

$P_{il} = \delta_{il} - k_i k_l \rightarrow$ projection into the plane orthogonal to k

$$D_{ij} = \begin{pmatrix} 1 & i & \\ i & -1 & \\ & & 0 \end{pmatrix}$$

z-direction: $P_{il} = \begin{pmatrix} 1 & & \\ & 1 & \\ & & 0 \end{pmatrix}$

$P_{il} D_{ij} = D_{lj}$

$\Lambda DD = D_{ij} D^*_{ij} - 0$

$= 4$

y-direction: $P_{ie} = \begin{pmatrix} 1 & & \\ & 0 & \\ & & 1 \end{pmatrix}$

$$P_{ik} D_{ij} P_{jk} = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{pmatrix}_{jk}$$

$$\Lambda DD = 1 - \frac{1}{2} = \frac{1}{2}$$

$$\boxed{\Lambda DD = \mathrm{Tr}\, PDPD - \frac{1}{2}(\mathrm{Tr}\, PD)^2}$$

There is a factor 8 between the radiation in the plane compared to the radiation orthogonal to the plane of the binary system.

problem 2:

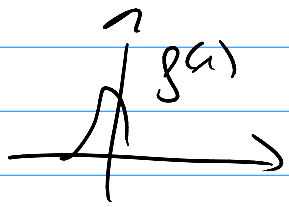
$$\vec{x} \to \vec{x} + \vec{a} = \vec{x}'$$

$$\rho'(\vec{x}') = \rho'(\vec{x} + \vec{a}) = \rho(\vec{x})$$

$$D_i' = \int dx' \, x' \, \rho'(x')$$

$$= \int dx' \, x' \, \rho(x)$$

$$= \int dx \, (\vec{x} + \vec{a}) \, \rho(x) = D + \vec{a} M$$



One of the standard arguments is that the monopole vanishes for the system and the radiation does not depend on the coordinate system chosen!

problem 3:

$$M = \int d^3x \, T^{00}$$

$$\partial_t M = \int d^3x \, \partial_0 T^{00}$$

$$= - \int d^3x \, \partial_i T^{i0} = \text{surface term}$$

$$= 0$$

$$D^i = \int d^3x \, x^i \, T^{00}$$

$$\partial_0^2 T^{00} = \partial_i \partial_l T^{il}$$

$$\partial_0^2 D^i = \int d^3x \, x^i \, \partial_j \partial_l \, T^{jl} = \text{surface term}$$

$$= 0$$

$$M = \text{const}$$

$$D^i = \text{const} + t \times \text{const.}$$

$$P \propto \frac{2G\omega^4}{5} \Lambda(\hat{k}) \, D(\omega) \, D^*(\omega)$$

$$D(\omega) = \sum \ldots D(\omega_i)$$

Fourier transform:

$$FT(1) = \delta(\omega)$$

$$FT(t) = \partial_\omega \delta(\omega)$$

the support of these function is basically
w = 0 and hence there is no radiation
produced.

The same argument can also be applied
in ED.

$$\partial_\mu j^\mu = 0 \qquad \rho_{ED} = j^0$$

So the ED radiation is also not
coordinate dependent even if the monopole
(the total charge of the system)
does not vanish.