

832 Homework Set 3 (due March 8)

Vacuum polarization in scalar QED:

Peskin-Schroeder Problem 9.1(c), page 312.

The theory of scalar QED is presented in part (a) of this problem. The calculation goes similar to that given in pages 245, 247, 249 and on.

Hints: If you wish to take it easy, you may just concentrate on the singular terms like $\Gamma(\epsilon) \approx \frac{1}{\epsilon}$, dropping the finite terms. To get the expected form exactly right, you may need to convince yourself that $\int_0^1 dx(1-2x)\Delta(x-x^2) = 0$, so that terms like $\int_0^1 dx(1-2x)\dots$ can be neglected.