

Physics 4261: Homework 8 (due Mar. 13, 2016)

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8.1. Fixed points of the optical Bloch equations (OBE)

- (a) Show that the OBE (eqn. 7.67 in the book) have a fixed point solution given by eqn. 7.68.
- (b) Set $u = u_0 + u'$ and so forth for v and w , where u_0 , v_0 , and w_0 define the steady-state fixed point from eqn. 7.68. Derive a set of differential equations for u' , v' , and w' (you would use these to determine the time evolution of these quantities).
- (c) Compute the derivative of $(u')^2 + (v')^2 + (w')^2$. Use this to argue that all the dynamics decays at least as fast as $e^{-\Gamma/2}$ and no faster than $e^{-\Gamma}$.

8.2. Foot 7.3

8.3. Foot 7.9