Problem from the book

Siegmann p.203, Problems for 4.4, task 1

Designed problem

In a two level system, find the symmetrical offset, ω_0, for two sinusoidal signals, i.e. $E = \text{Re}\left\{E_1 e^{j\omega_1 t} + E_2 e^{j\omega_2 t}\right\}$ where $\omega_1 = \omega_a - \omega_0$ and $\omega_2 = \omega_a + \omega_0$, that assures that their combined change in stored energy equals the change in stored energy at resonance. Derive a general expression and apply it to the specific situation when $|E_1|^2 = \frac{1}{4}|E_a|^2$ and $|E_2|^2 = \frac{3}{4}|E_a|^2$ where E_a is the amplitude at resonance.

Hints: *Assume low power, $P = \varepsilon\chi E$ and average over a few optical cycles.*