5.5 Part b Part 2 $\frac{4\omega}{4\omega+1} = \pm\mu\sqrt{\mu - \Delta v/2\rho}$

$$\omega = \frac{-\mu\sqrt{\mu - \Delta v/2\rho}}{4(\mu\sqrt{\mu - \Delta v/2\rho} \pm 1)}$$

$$\mu - \frac{\Delta v}{2\rho} - \frac{\omega}{\hat{\sigma}_x^2} = \frac{4\omega}{\mu^2(4\omega+1)}$$

$$(\mu - \tfrac{\Delta v}{2\rho}) + \frac{1}{\mu^2}(\mu\sqrt{\mu - \Delta v/2\rho}) = \frac{-1}{4\hat{\sigma}_x^2}\left(\frac{\mu\sqrt{\mu - \Delta v/2\rho}}{\mu\sqrt{\mu - \Delta v/2\rho} + 1}\right)$$

$$\frac{1}{\mu}\sqrt{\mu - \tfrac{\Delta v}{2\rho}} + \frac{1}{\mu^2} = \frac{-1}{4\hat{\sigma}_x^2}\left(\frac{1}{\mu\sqrt{\mu - \Delta v/2\rho} + 1}\right)$$

$$\frac{1}{\mu}\sqrt{\mu - \Delta v/2\rho}\left(\mu\sqrt{\mu - \Delta v/2\rho} + 1\right) + \frac{1}{\mu^2}\left(\mu\sqrt{\mu - \Delta v/2\rho} + 1\right) = \frac{-1}{4\hat{\sigma}_x^2}$$

$$(\mu - \Delta v/2\rho) + \frac{1}{\mu}\sqrt{\mu - \Delta v/2\rho} + \frac{1}{\mu}\sqrt{\mu - \Delta v/2\rho} + \frac{1}{\mu^2} = \frac{-1}{4\hat{\sigma}_x^2}$$

$$(\mu - \tfrac{\Delta v}{2\rho}) + \frac{2}{\mu}\sqrt{\mu - \Delta v/2\rho} + \frac{1}{\mu^2} = \frac{-1}{4\hat{\sigma}_x^2}$$

$$\left(\sqrt{\mu + \tfrac{\Delta v}{2\rho}} + \frac{1}{\mu}\right)^2 = \frac{-1}{4\hat{\sigma}_x^2}$$

$$\boxed{\sqrt{\mu + \Delta v/2\rho} + \frac{1}{\mu} = \frac{\pm i}{2\hat{\sigma}_x}}$$