(1) Using the reservation wage equation from class:

\[ u(w^*) = u(b) + \frac{\alpha}{r + \lambda} \int_{w^*}^{\infty} u(\eta) - u(w^*)dF(\eta) \]

Derive the comparative statics of \( w \) with \( \alpha, r, \lambda, b \). Consider the effect of a first-order stochastic shift in \( F \). What happens to \( w^* \) if there is a mean-preserving spread in \( F \)? (You can use examples for the latter two parts.)

(2) Consider the basic search model in which \( F \) is degenerate. That is, whenever someone is employed it is at the same wage \( w > b \). However, to receive wage offers unemployed workers must incur a cost \( c \) each period. That is, they can choose not to look for work and continue to get \( b \). If they choose to look for work they get \( b - c \). For a given value of \( w \) and \( b \) derive an expression for the critical value of \( c \) at which workers are just indifferent between looking for work and permanent unemployment.

(3) Consider the basic search model in which \( F \) is degenerate at \( w > b \). Suppose the government ran an unemployment insurance scheme which took \( \tau \) from employed workers and gave \( z \) to unemployed workers. If the objective is to maximize average welfare, \( W \) where

\[ W = n_u V_u + n_e V_e \]

Show that whenever workers are risk averse optimal policy leads to \( w - \tau = z + b \). When workers are risk-neutral, show that welfare is unaffected by the choice of \( \tau \) as long as the budget is balanced. Budget balance requires

\[ n_u z = n_e \tau \]

(4) Consider the Diamond Cocoanut model with constant returns to matching in the trading island. Suppose that \( \alpha \), the probability that a producer finds a tree with a nut, is inversely related to the number of people on the island. That is replace \( \alpha \) by \( \alpha(n_P) \) where \( \alpha' < 0, \alpha(0) = 1, \alpha(1) = 0 \). Are multiple steady-state equilibria possible? You might want to use an example, e.g. \( \alpha(n_P) = 1 - n_P \) or \( \alpha(n_P) = (1 - n_P)^2 \). Give intuition for any answer you find.