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% Parameters
beta = 0.95;
cl = exp(0.98);
ch = exp(1.02);
Pi_L = 0.5; % Probability of low state
Pi_H = 0.5; % Probability of high state
R = 0;

% Define parameters based on given values
alpha_values = [1, 0.5, -1];
rho_values = [1, 0.5, -1];

% Tolerance level
tol = 1e-8;
max_iter = 1000;

% Function to compute f(U0)
f_U0 = @(U0, alpha, rho) ((Pi_L * ((1 - beta) * cl^rho + beta * U0^rho)^(alpha/rho) + ...
    Pi_H * ((1 - beta) * ch^rho + beta * U0^rho)^(alpha/rho))^(1/alpha)) - R;

% Create variables to store results
alpha_results = zeros(length(alpha_values), 3);
rho_results = zeros(length(rho_values), 3);

% Iterate to make alpha table
for i = 1:length(alpha_values)
    alpha = alpha_values(i);
    rho = 1; % Keep rho fixed

    % Initial guess
    U0_old = 1;
    iter = 0;

    while true
        % Compute new U0
        U0_new = f_U0(U0_old, alpha, rho);

        % Check convergence
        if abs(U0_new - U0_old) < tol || iter > max_iter
            break;
        end

        % Update
        U0_old = U0_new;
        iter = iter + 1;
    end

    % Save result
    eta = U0_old;
    alpha_results(i, :) = [alpha, eta, iter];
end

% Iterate for rho table
for j = 1:length(rho_values)
    rho = rho_values(j);
    alpha = 1; % Keep alpha fixed

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% Initial guess
U0_old = 1;
iter = 0;

while true
    % Compute new U0
    U0_new = f_U0(U0_old, alpha, rho);

    % Check convergence
    if abs(U0_new - U0_old) < tol || iter > max_iter
        break;
    end

    % Update
    U0_old = U0_new;
    iter = iter + 1;
end

% Save result
eta = U0_old;
rho_results(j, :) = [rho, eta, iter];
end

% Create tables
alpha_table = array2table(alpha_results, 'VariableNames', {'Alpha', 'Eta', 'Iterations'});
rho_table = array2table(rho_results, 'VariableNames', {'Rho', 'Eta', 'Iterations'});

% Display tables
disp('Results for different Alpha values:');
disp(alpha_table);

disp('Results for different Rho values:');
disp(rho_table);

```

Results for different Alpha values:

Alpha	Eta	Iterations
1	2.7188	312
0.5	2.7188	312
-1	2.7188	312

Results for different Rho values:

Rho	Eta	Iterations
1	2.7188	312
0.5	2.7186	316
-1	2.7178	331