```
% The infinite dimensional state space for the harmonic oscillator will be
% represented in the photon number basis.
% We will truncate the Hilbert space at maxPhotonNumber photons.
maxPhotonNumber = 10;

% First, pre-compute a lot of numbers, such as coefficients for Hermite
% polynomials, factorials, binomial coefficients.
S = init_tables(maxPhotonNumber);

% Make state vector for Schrodinger cat state.
alpha = 2;  % amplitude of coherent states in the superposition
phase = 0;  % phase between superposition
psi1 = generate_cat_vector(alpha, phase, S);
% The Schrodinger cat state suffers from some loss by passing through a
% medium with etaState efficiency.
etaState1 = 1;
rho1 = apply_loss(psi1,etaState1,S);
% Now it must be represented by a density matrix, rho.
psi2 = generate_cat_vector(alpha, phase, S);
etaState2 = 0.9;
rho2 = apply_loss(psi2,etaState2,S);

F = fidelity(rho1, rho2)
```