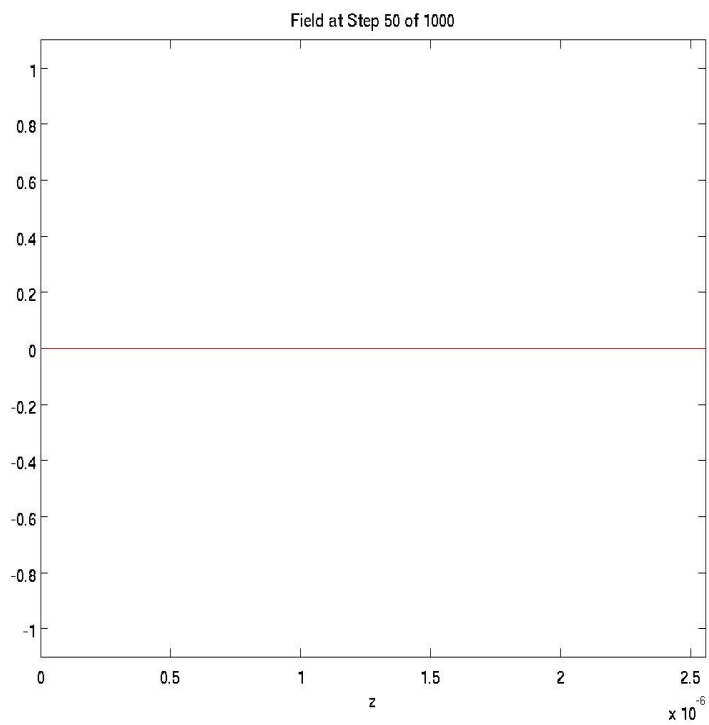
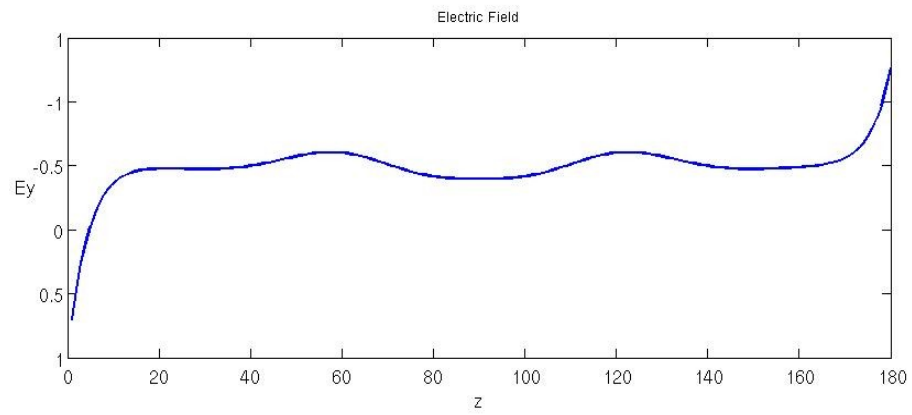
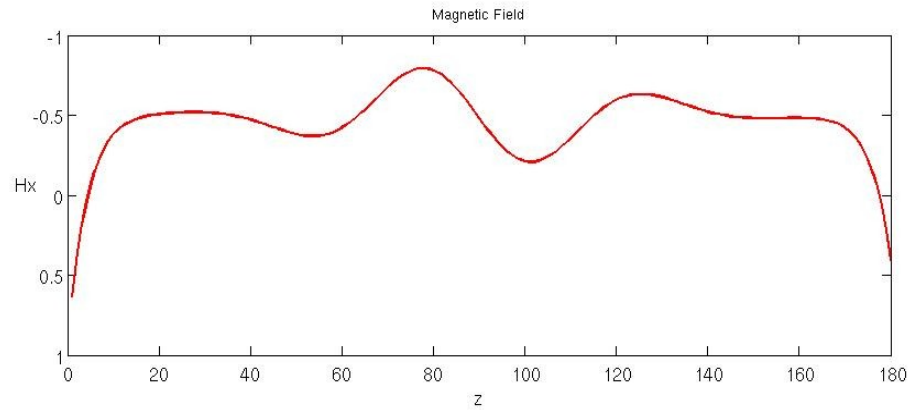
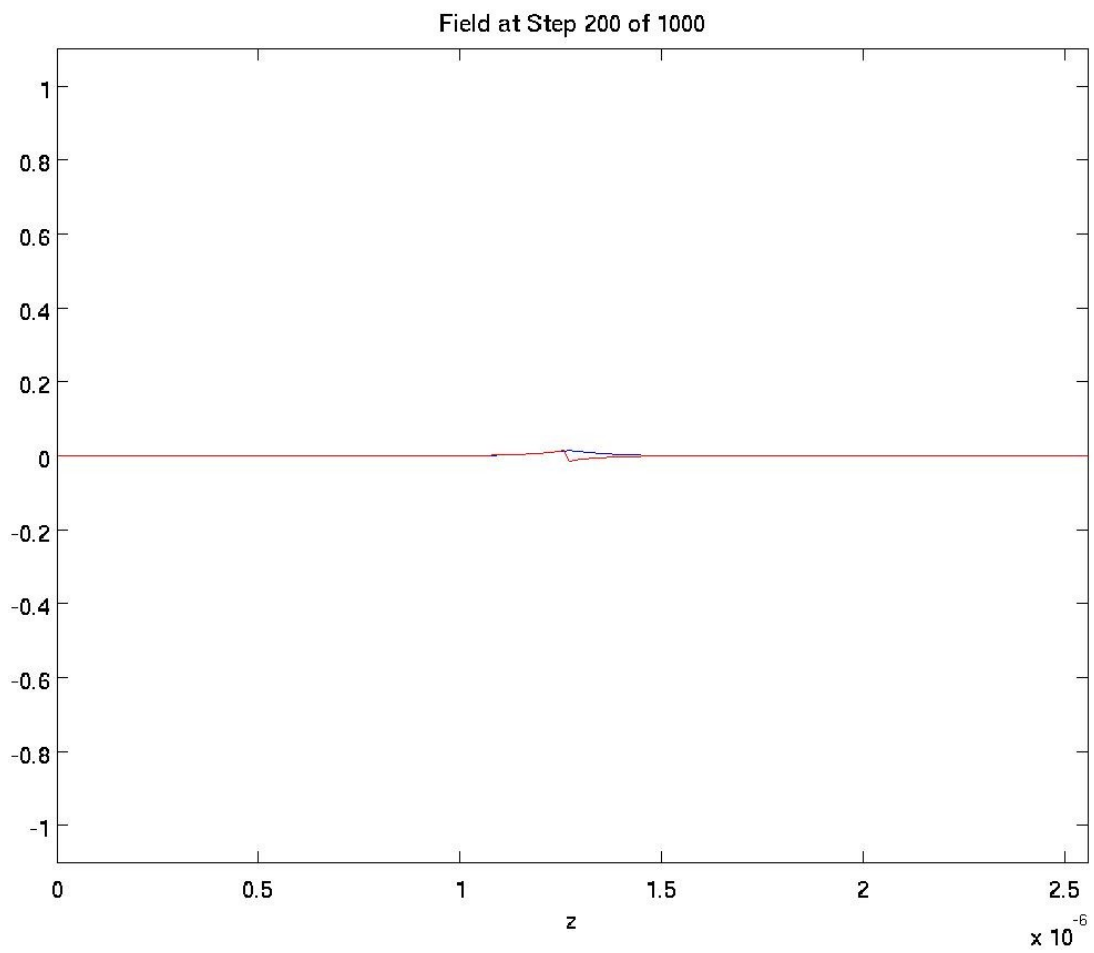
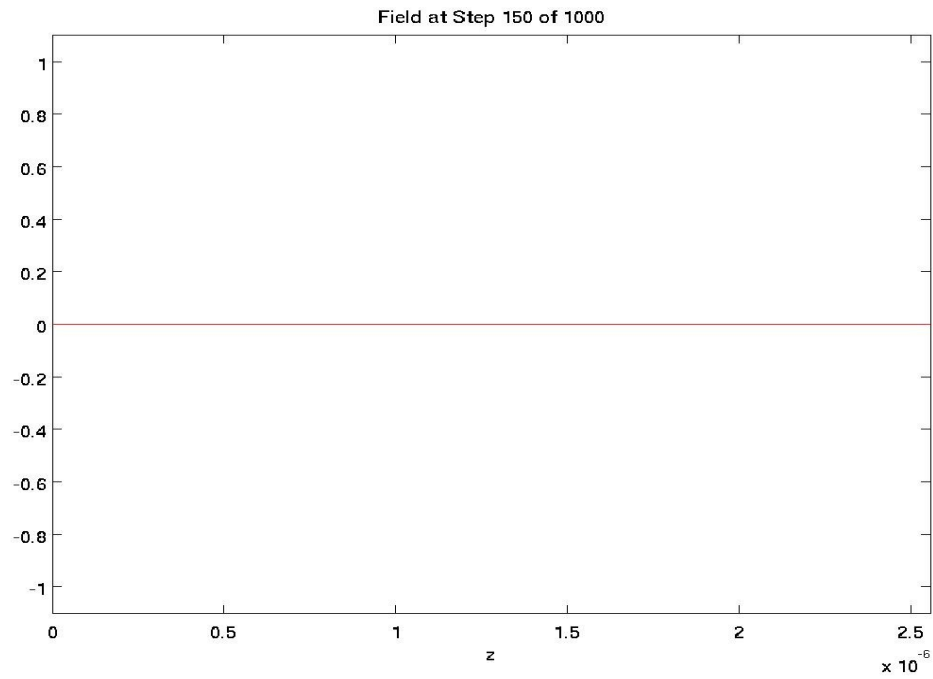
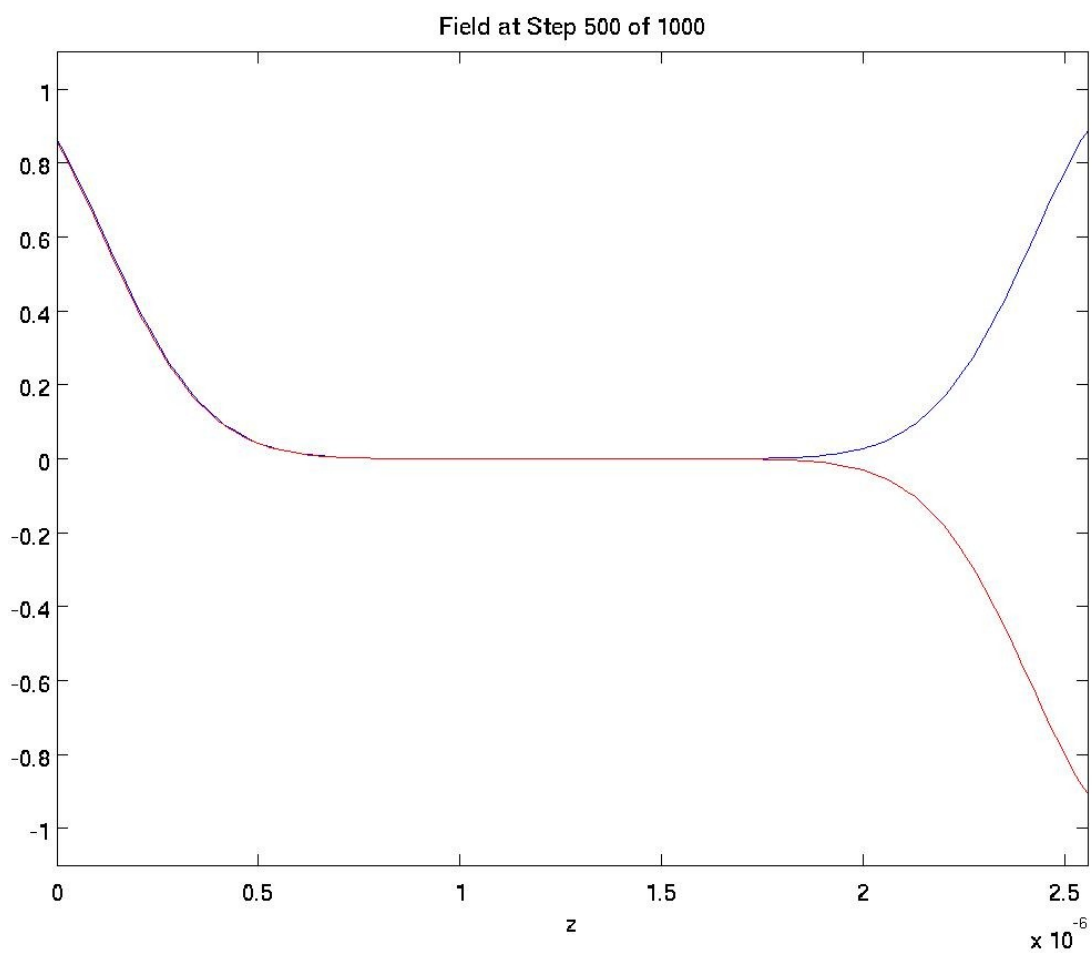
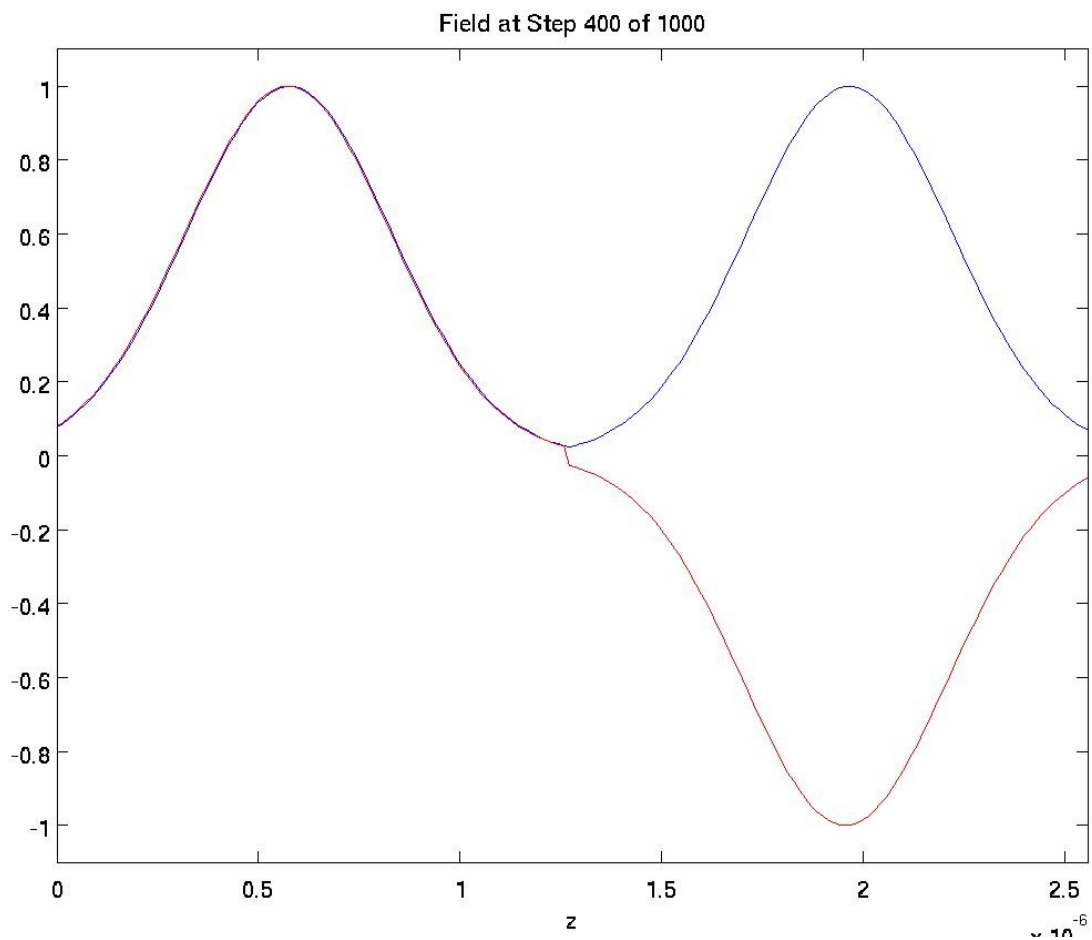
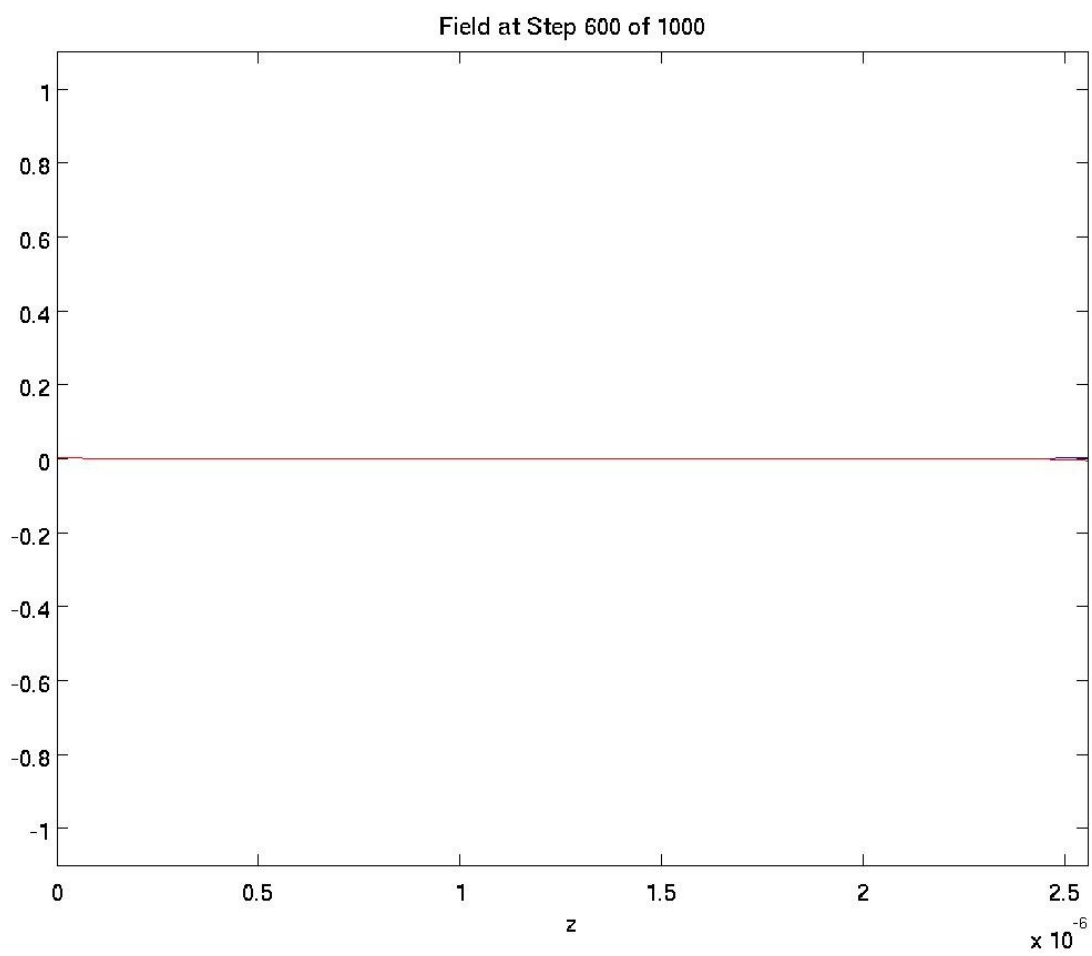
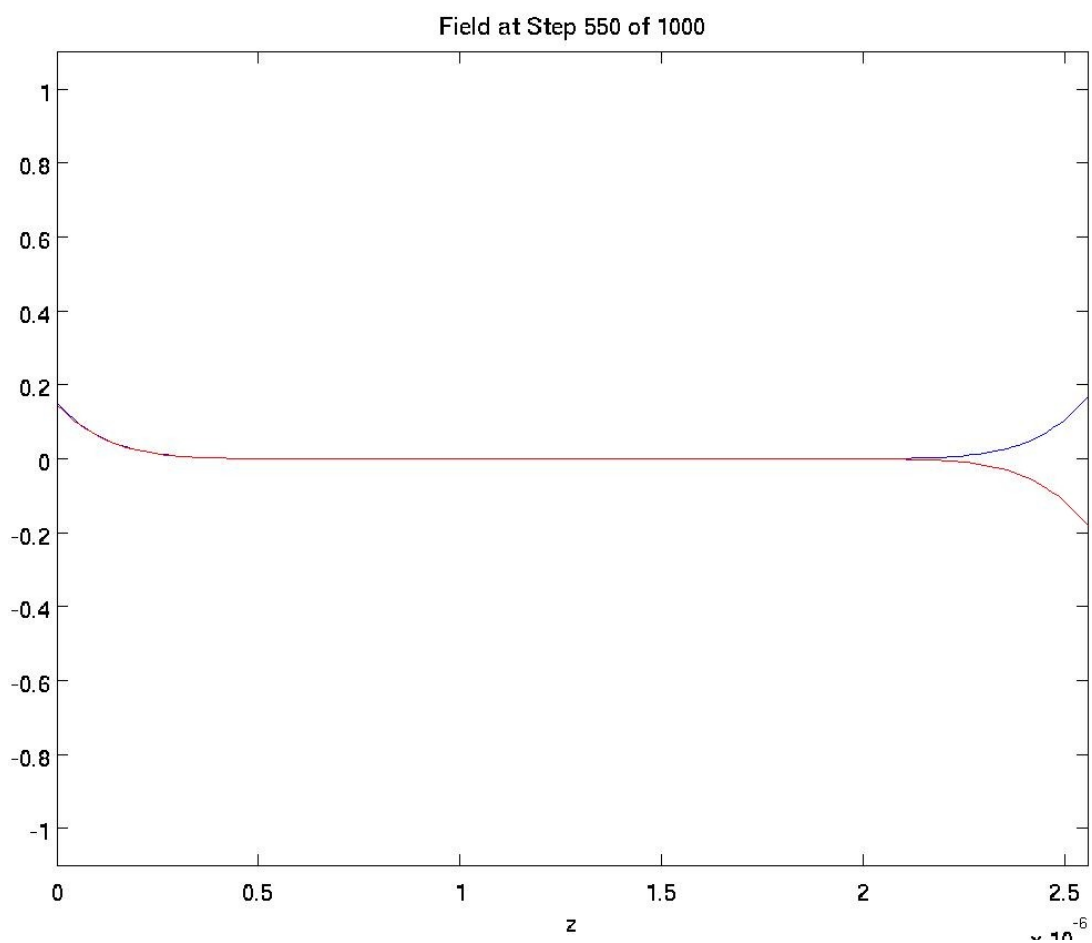


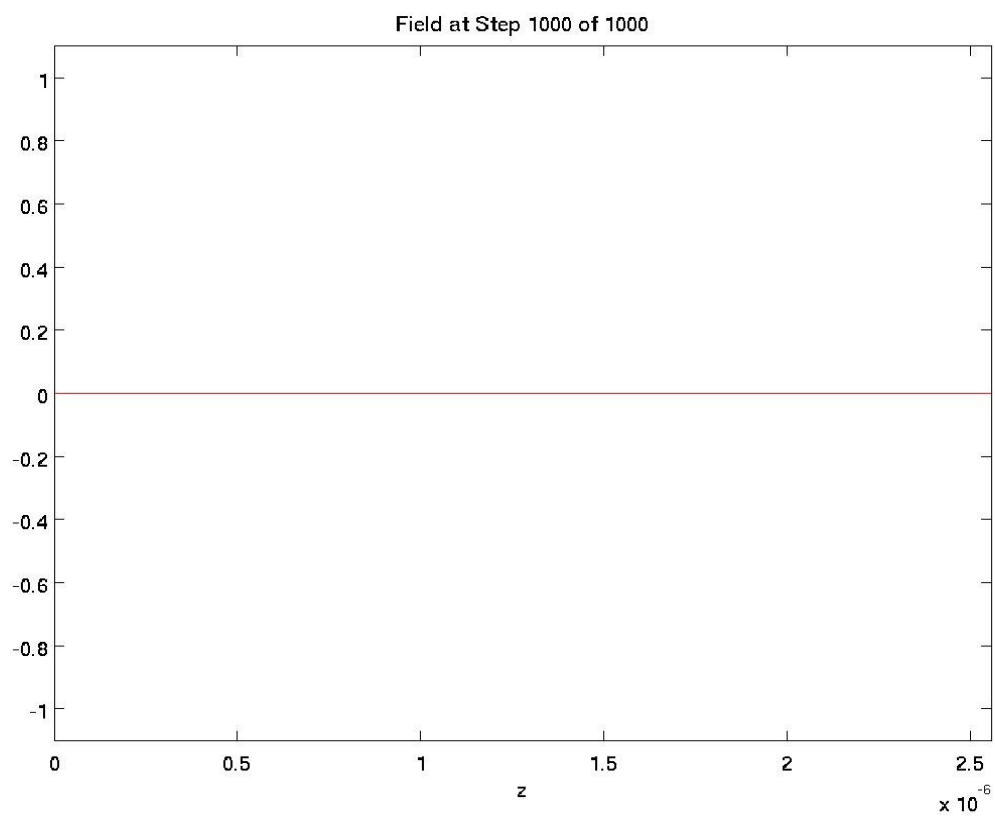
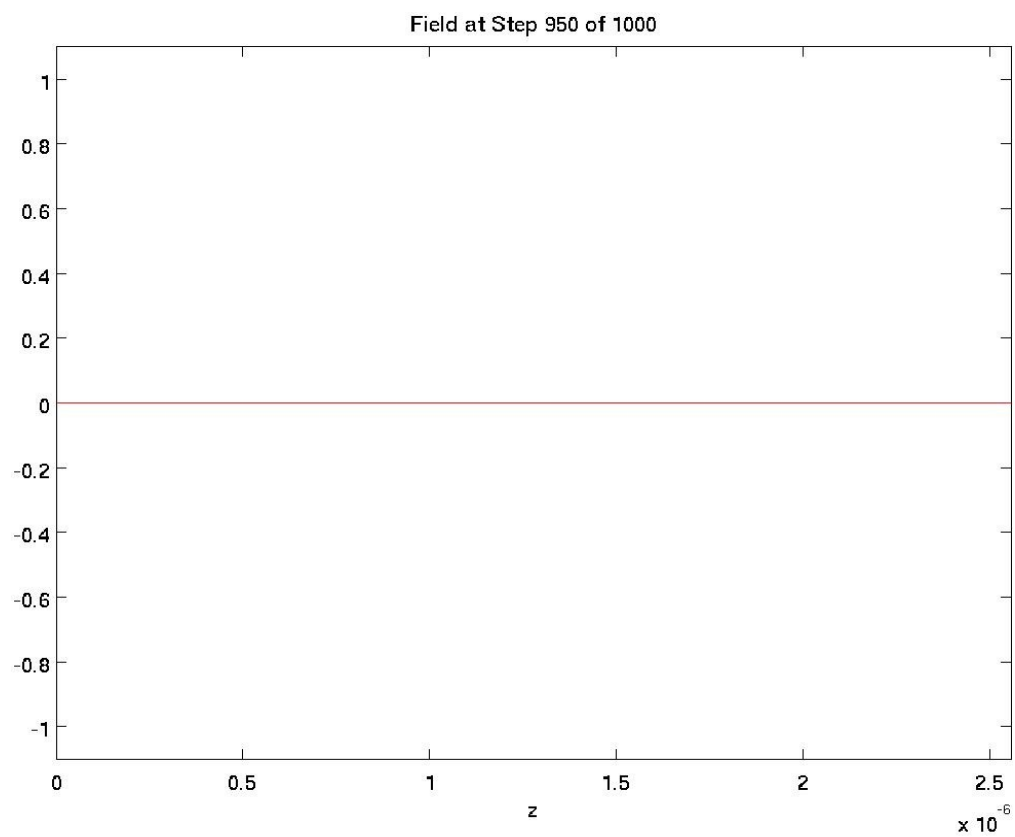
## Problem 2











%FDTD1D

[illegible]

```

% Compute Update Coefficients
mER = (c0*dt/dz)./ER;
mHR = (c0*dt/dz)./UR;

% Initialize Feilds
Ey = zeros([1 Nz]);
Hx = zeros([1 Nz]);

%PAB Parameters
h1 = 0; h2 = 0; h3 = 0;
e1 = 0; e2 = 0; e3 = 0;

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Execute Simulation
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

for t = 1:STEPS

    % Calculate H
    for nz = 1:Nz-1
        Hx(nz) = Hx(nz) + mHR(nz)*(Ey(nz+1)-Ey(nz));
    end

    Hx(Nz) = Hx(Nz) + mHR(Nz)*(e3 - Ey(Nz));

    h3 = h2; h2 = h1; h1 = Hx(1); % Boundary Params;

    % Calculate E
    Ey(1) = Ey(1) + mER(1)*(Hx(1) - h3);
    for nz = 2:Nz
        Ey(nz) = Ey(nz) + mER(nz)*(Hx(nz)-Hx(nz-1));
    end

    %Inject Source
    Ey(nzc) = Ey(nzc) + Esrc(t);

    e3=e2; e2=e1; e1=Ey(Nz); % Boundary Params;

    h = plot(za, Ey, '-b'); hold on;
    plot(za, Hx, '-r'); hold off;
    axis([za(1) za(Nz) -1.1 1.1]);
    xlabel('z');
    title(['Field at Step ' num2str(t) ' of ' num2str(STEPS)]);
    drawnow();

    if(mod(t,50) == 0)
        saveas(h, ['images/' num2str(t) '.jpg'], 'jpg');
    end
end

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Plot Fields
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
fig = figure;
SetFigure(fig, 'HW#3-P2', [500 274 965 826]);

```

```
%Plot Magnetic Field
subplot(211)
h = plot(Hx, '-r', 'LineWidth', 2);
title('Magnetic Field');
h = get(h, 'Parent');
set(h, 'FontSize', 14);
xlabel('z');
ylabel('Hx', 'Rotation', 0);
set(gca, 'YTickLabel', {'1', '0.5', '0', '-0.5', '-1'})
```

```
%Plot Electric Field
subplot(212)
h = plot(Ey, '-b', 'LineWidth', 2);
title('Electric Field');
h = get(h, 'Parent');
set(h, 'FontSize', 14);
xlabel('z');
ylabel('Ey', 'Rotation', 0);
set(gca, 'YTickLabel', {'1', '0.5', '0', '-0.5', '-1'})
```