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% Force and Displacement Data
displacement = linspace(0, 20, 100); % Displacement values (mm)

% FEM Data for Different Impact Energies
force_FEM_4_13 = 0.2 * displacement.^2; % FEM force values for 4.13 J
force_FEM_4_97 = 0.25 * displacement.^2; % FEM force values for 4.97 J
force_FEM_10_03 = 0.35 * displacement.^2; % FEM force values for 10.03 J

% Experimental Data for Different Impact Energies
force_Exp_4_13 = 0.18 * displacement.^2; % Experimental force values for 4.13 J
force_Exp_4_97 = 0.22 * displacement.^2; % Experimental force values for 4.97 J
force_Exp_10_03 = 0.32 * displacement.^2; % Example Experimental force values for
10.03 J

% Plotting
figure;
hold on;

% FEM Simulation Plots
plot(displacement, force_FEM_4_13, 'r-', 'LineWidth', 1.5, 'DisplayName', 'FEM 4.13
J');
plot(displacement, force_FEM_4_97, 'g-', 'LineWidth', 1.5, 'DisplayName', 'FEM 4.97
J');
plot(displacement, force_FEM_10_03, 'b-', 'LineWidth', 1.5, 'DisplayName', 'FEM
10.03 J');

% Experimental Data Plots
plot(displacement, force_Exp_4_13, 'r--', 'LineWidth', 1.5, 'DisplayName', 'Exp
4.13 J');
plot(displacement, force_Exp_4_97, 'g--', 'LineWidth', 1.5, 'DisplayName', 'Exp
4.97 J');
plot(displacement, force_Exp_10_03, 'b--', 'LineWidth', 1.5, 'DisplayName', 'Exp
10.03 J');

% Formatting the Plot
xlabel('Displacement (mm)', 'FontSize', 12);
ylabel('Force (N)', 'FontSize', 12);
title('Force-Displacement Curves for FEM and Experimental Results', 'FontSize', 14);
legend('show', 'Location', 'northwest');
grid on;
hold off;

```

Force-Displacement Curves for FEM and Experimental Results

