**Question 2**

syms s F;

**% Define the coeff. matrix A and constant matrix C**

A = [8\*s^2 + 4\*s + 16, -4\*s - 1, -15; ...

-4\*s - 1, 3\*s^2 + 20\*s + 1, -16\*s; ...

-15, -16\*s, 16\*s + 15];

C = [0; F; 0];

**% Solve the system of equations and compute G1**

B = linsolve(A, C);

X3 = B(3);

G1 = sym2tf(X3 / F);

**% Display the result**

display(charG1);

**Output**

**G1 =**

128 s^3 + 64 s^2 + 316 s + 15

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384 s^5 + 1064 s^4 + 3476 s^3 + 165 s^2

**Question 3**

syms s T J1 J2 D Deq K;

% Define the coeff. matrix A and constant matrix C

A = [Jeq1\*s^2 + K -K 0; -K -K + D\*s -D\*s; ...

0 -D\*s Jeq2\*s^2 + Deq\*s + D\*s];

C = [T; 0; 0];

**% Solve the system of equations and compute G1**

B = linsolve(A, C);

theta1 = B(1);

G1 = theta1 / T;

**% Display the result**

display(G1);

**Output**

**G1 =**

(D\*K + Deq\*K - D\*Deq\*s + Jeq2\*K\*s - D\*Jeq2\*s^2)

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(2\*D\*K^2 + 2\*Deq\*K^2 + 2\*Jeq2\*K^2\*s - D\*Deq\*Jeq1\*s^3 - D\*Jeq1\*Jeq2\*s^4 + D\*Jeq1\*K\*s^2 - D\*Jeq2\*K\*s^2 + Deq\*Jeq1\*K\*s^2 + Jeq1\*Jeq2\*K\*s^3 - D\*Deq\*K\*s)