

```
syms m1 m2 m3 B1 B2 k1 k2
```

```
A = [0, 0, 0, -1 / m1, 0;  
     0, -B1 / m2, B1 / m2, 1 / m2, -1 / m2;  
     0, B1 / m3, -(B1 + B2) / m3, 0, 1 / m3;  
     k1, -k1, 0, 0, 0;  
     0, k2, -k2, 0, 0]
```

$$A = \begin{pmatrix} 0 & 0 & 0 & -\frac{1}{m_1} & 0 \\ 0 & -\frac{B_1}{m_2} & \frac{B_1}{m_2} & \frac{1}{m_2} & -\frac{1}{m_2} \\ 0 & \frac{B_1}{m_3} & -\frac{B_1 + B_2}{m_3} & 0 & \frac{1}{m_3} \\ k_1 & -k_1 & 0 & 0 & 0 \\ 0 & k_2 & -k_2 & 0 & 0 \end{pmatrix}$$

```
B = [1/m1; 0; 0; 0; 0]
```

$$B = \begin{pmatrix} \frac{1}{m_1} \\ 0 \\ 0 \\ 0 \\ 0 \end{pmatrix}$$

```
C = [0 0 1 0 0]
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```
C = 1x5  
     0     0     1     0     0
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D = [0]
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D = 0
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```
syms s
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H = C * inv(s * eye(5) - A) * B + D
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H =
```

$$\frac{B_2 k_1 k_2 + k_1 k_2 m_1 s + k_1 k_2 m_2 s + k_1 k_2 m_3 s + B_1 B_2 m_1 s^3 + B_1 k_1 m_1 s^2 + B_1 k_1 m_2 s^2 + B_2 k_1 m_1 s^2 + B_1 k_1 m_3}{s^5 + \frac{B_1}{m_1} s^4 + \left(\frac{B_1}{m_2} - \frac{B_1 + B_2}{m_3} + \frac{k_1}{m_1}\right) s^3 + \left(-\frac{B_1}{m_2} + \frac{B_1}{m_3} - k_1 + \frac{k_2}{m_1}\right) s^2 + \left(\frac{1}{m_2} - \frac{1}{m_3} + k_1 - k_2\right) s + \frac{1}{m_1}}$$