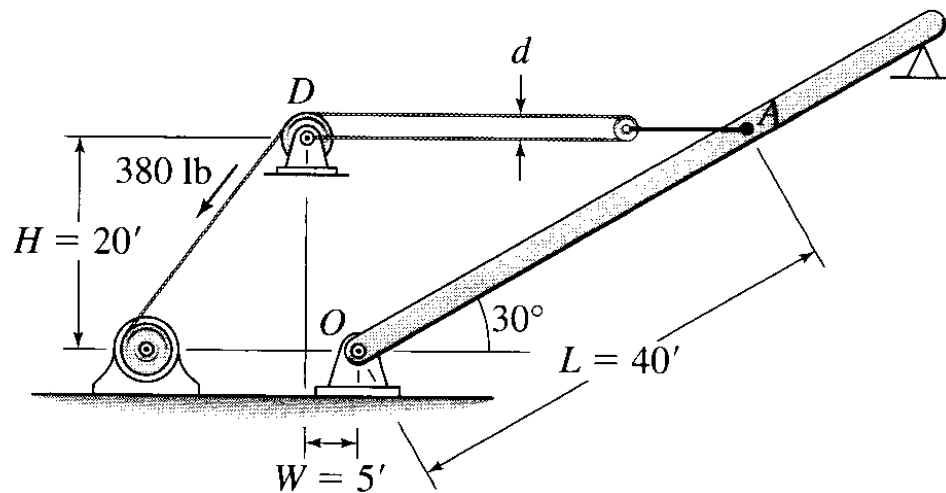26. Consider the system for lifting a mast shown in Figure P26. The 70-ft-long mast weighs 500 lb. The winch applies a force $f = 380$ lb to the cable. The mast is supported initially at an angle of 30°, and the cable at A is initially horizontal. The equation of motion of the mast is

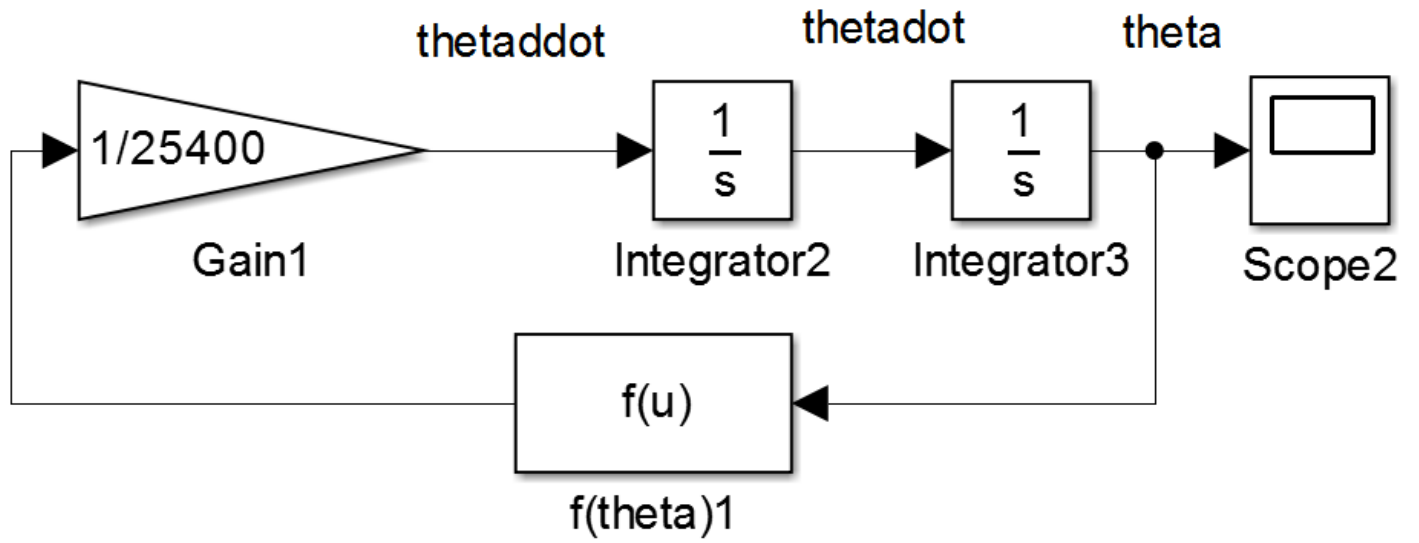$$25\,400\,\ddot{\theta} = -17\,500 \cos \theta + \frac{626\,000}{Q} \sin(1.33 + \theta)$$

where

$$Q = \sqrt{2020 + 1650 \cos(1.33 + \theta)}$$

Create and run a Simulink model to solve for and plot $\theta(t)$ for $\theta(t) \le \pi/2$ rad.

Figure P26

thetaddot   thetadot   theta

$\dfrac{1}{25400}$

Gain1

$\dfrac{1}{s}$

Integrator2

$\dfrac{1}{s}$

Integrator3

Scope2

f(u)

f(theta)1

S

Integra

f(u)

f(theta)1

Function Block Parameters: f(theta)1

Fcn

General expression block. Use "u" as the input variable name.
Example: sin(u(1)*exp(2.3*(-u(2))))

Parameters

Expression:

-17500*cos(u)+626000*sin(1.33+u)/sqrt(2020+1650*cos(1.33+u))

Sample time (-1 for inherited):

-1

OK   Cancel   Help   Apply