```matlab
format compact;

% Force - Offset Mass

e = 1.03; % in. [eccentricity (constant)]
wn1 = 8.0486; % Hz ["natural/driving" freq. (constant)]
m = 2.86; % lbm [max offset mass (constant)]

wn1rad = wn1.*(2*pi); % rad/s

figure(1)
fo = @(mo) (mo.*(e/12).*(wn1rad).^2)./(32.2); % Magnitude of Force
 Generated (lbf)
fplot(fo,[0 m],'r','Linewidth',1.5)
grid on;
title("Force - Offset Mass Relationship | e = " +e+ " in. & \omegar =
 " +wn1+ " Hz")
xlabel('Mass of Offset, mo (lbm)')
ylabel('Magnitude of Force Generated, Fo (lbf)')

fo_largem = fo(2.86)
fo_medm = fo(2.145)
fo_smallm = fo(1.43)

fo_largem =
   19.4969
fo_medm =
   14.6227
fo_smallm =
    9.7485
```
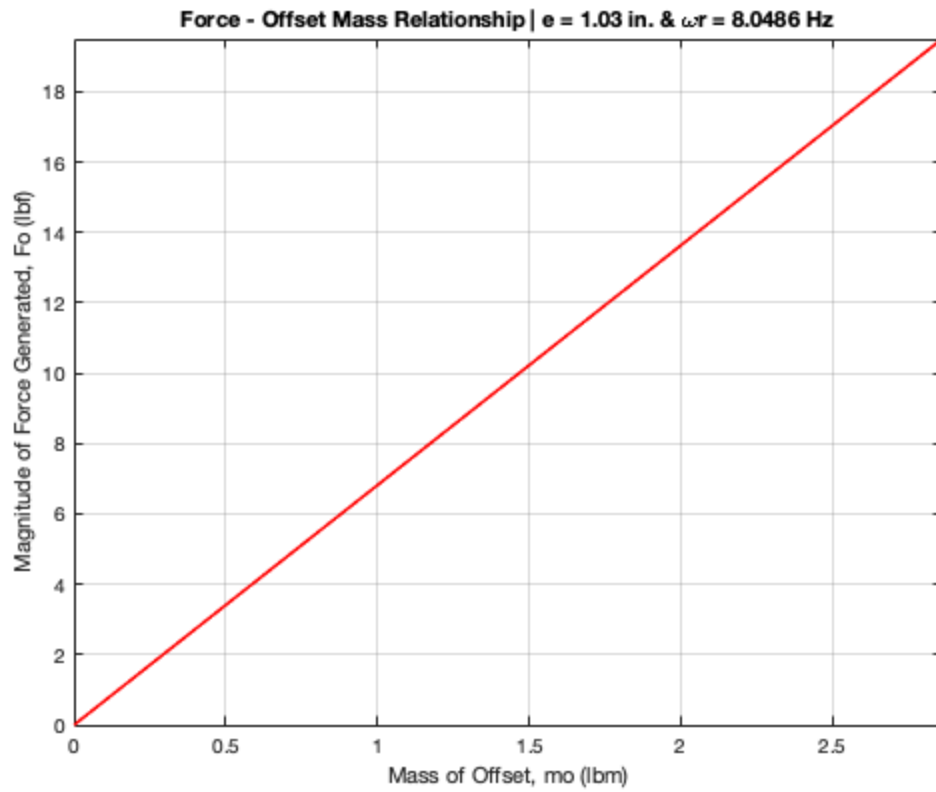
Force - Offset Mass Relationship | e = 1.03 in. & ωr = 8.0486 Hz

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```matlab
format compact;

% Force - Eccentricity

e1 = 1.03; % in. [max eccentricity (constant)]
wn1 = 8.0486; % Hz ["natural/driving" freq. (constant)]
mo = 2.86; % lbm [offset mass (constant)]

wn1rad = wn1.*(2*pi); % rad/s

figure(1)
fo = @(e) (mo.*(e/12).*(wn1rad).^2)./(32.2); % Magnitude of Force
 Generated (lbf)
fplot(fo,[0 e1],'b','Linewidth',1.5)
grid on;
title("Force - Eccentricity Relationship | mo = " +mo+ " lb & \omegar
 = " +wn1+ " Hz")
xlabel('Eccentricity, e (in)')
ylabel('Magnitude of Force Generated, Fo (lbf)')

foe = fo(1.03)

foe =
   19.4969
```
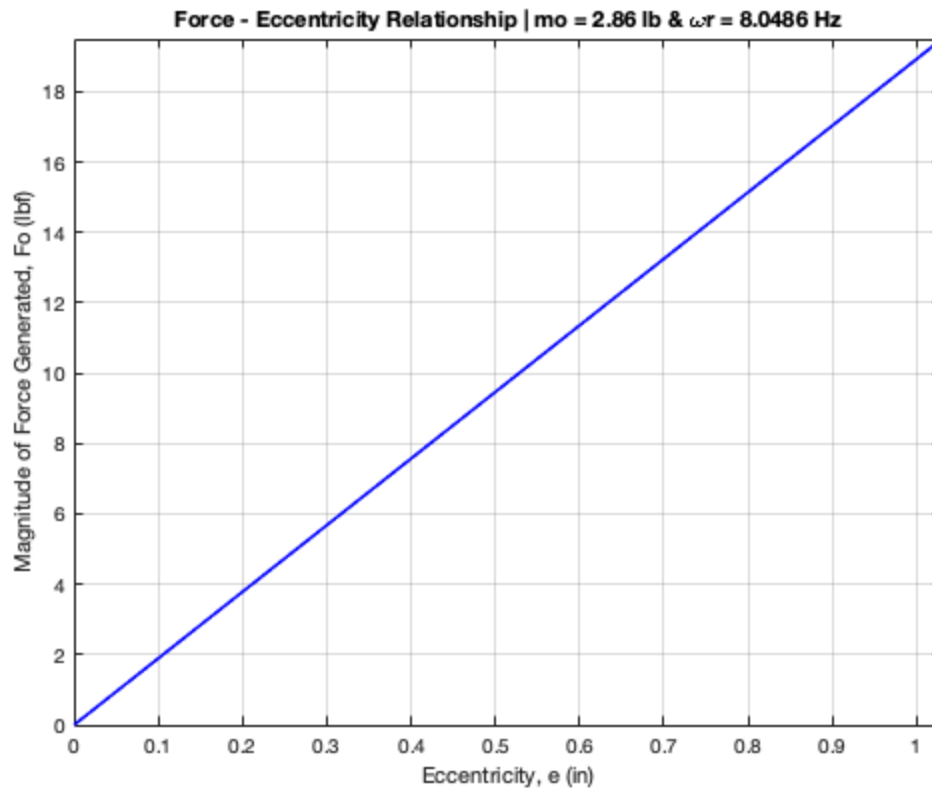

Force - Eccentricity Relationship | mo = 2.86 lb & ωr = 8.0486 Hz

```matlab
format compact;

% Force - Driving Freq.

e = 1.03; % in. [eccentricity (constant)]
wn1 = 8.0486; % Hz [1st "natural/driving" freq. (constant)]
wn2 = 24.045; % Hz [2nd "natural/driving" freq. (constant)]
mo = 2.86; % lbm [offset mass (constant)]

% NOTE: wn1 = 8.0486 Hz = 50.571 rad/s (First Natural Freq.)
%       wn2 = 24.045 Hz = 151.079 rad/s (Second Natural Freq.)

wn1rad = wn1.*(2*pi); % rad/s
wn2rad = wn2.*(2*pi); % rad/s

figure(1)
fo = @(omega2) (mo.*(e/12).*(omega2).^2)./(32.2); % Magnitude of Force
 Generated (lbf)
fplot(fo,[0 wn2rad],'g','Linewidth',1.5)
grid on;
hold on;
plot(wn1rad,fo(wn1rad),'ro','Linewidth',1.5)
plot(wn2rad,fo(wn2rad),'bo','Linewidth',1.5)
title("Force - Driving Frequency Relationship | mo = " +mo+ " lb & e =
 " +e+ " in.")
xlabel('Driving Frequency, \omegar (rad/s)')
ylabel('Magnitude of Force Generated, Fo (lbf)')
legend('Force v. Freq Curve','\omega1','\omega2')

fown1 = fo(wn1rad)
fown2 = fo(wn2rad)

fown1 =
   19.4969
fown2 =
  174.0105
```
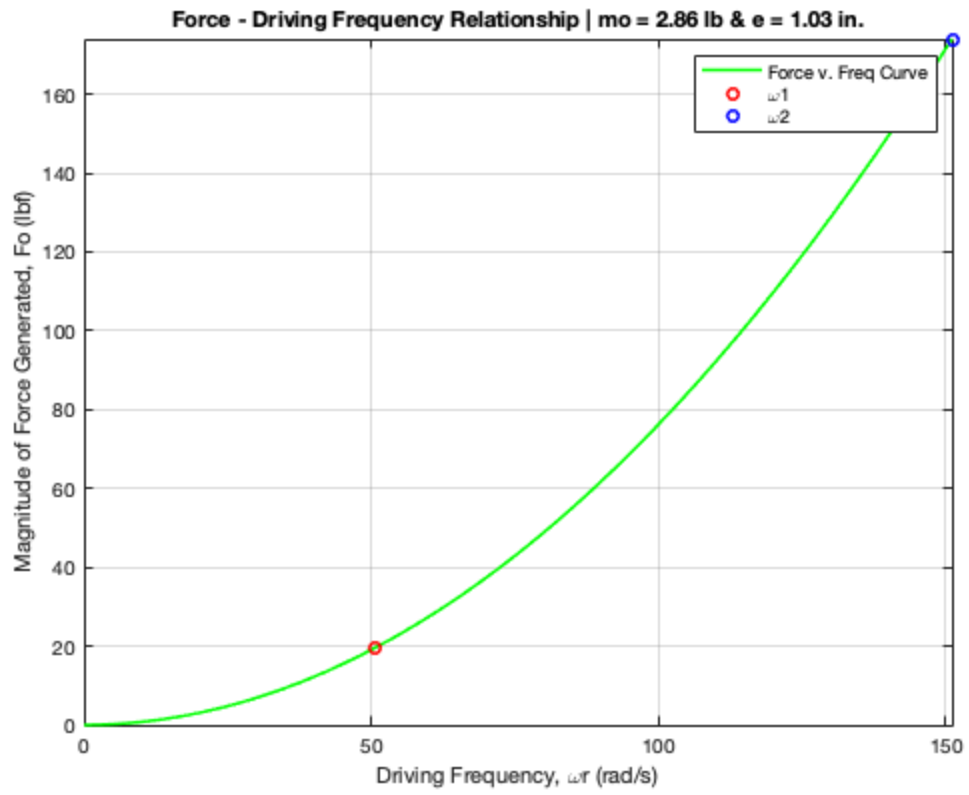
Force - Driving Frequency Relationship | mo = 2.86 lb & e = 1.03 in.

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