Cycloidal Displacement

The equation of cycloidal displacement, as shown in Fig 1, is:

$$s = h\left[\frac{\theta}{\beta} - \frac{1}{2\pi}\sin\left(2\pi\frac{\theta}{\beta}\right)\right.$$

The displacement s is the projection of a point of cycloidal curve, which is generated by rolling a circle on a line, to the s-axis (y-axis).

The velocity, acceleration and jerk equations are:

$$v = \frac{h}{\beta}\left[1 - \cos\left(2\pi\frac{\theta}{\beta}\right)\right.$$

$$a = 2\pi\frac{h}{\beta^2}\sin\left(2\pi\frac{\theta}{\beta}\right.$$

$$j = 4\pi^2\frac{h}{\beta^3}\sin\left(2\pi\frac{\theta}{\beta}\right.$$

where h is the total rise, or lift, θ is the camshaft angle, and β is the total angle of the rise interval. The s v a j diagrams are shown in Fig. 2.

Figure 1

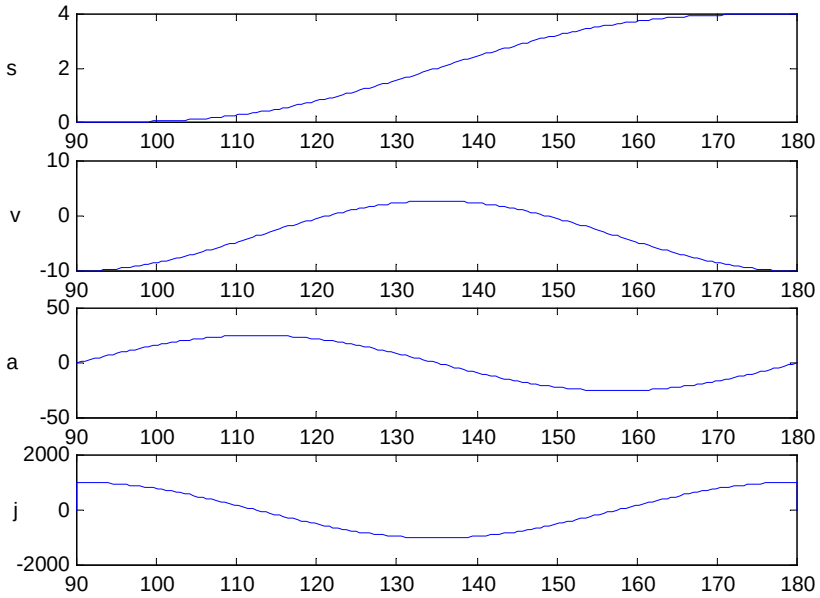

Figure 2