Introduction
2 Elastic hinges or flexure hinges in parallel form a reinforced leaf spring and can be used in monolithic structures to be able to have relative motion or displacement. This sheet elaborates on the design of these flexure hinges to acquire the desired stiffness for your suspension.

Usage
Used as a stiff alternative ($C_s$) for a leaf spring. Note that stiffness in other directions increase as well.

Geometric & motion characteristics
$$L_p = \frac{L_0 + L_{BF}}{2}$$
$$\beta = \frac{h}{D}$$
$$L_{RF} = L_p - \sqrt{(h - T)(T - h - 2D)}$$
# if hinge geometry is of shape 1 or 3

Stiffness at point B
$$C_{Bx} = \frac{6Et^3}{25T + 64RF} \sqrt{\beta}$$

$$C_{By} = \frac{Et^3}{25T^2 + 2L_{RF}^2} \sqrt{\beta}$$

$$C_{Bz} = \frac{Et^3}{75T^2 + L_{RF}^2} \sqrt{\beta}$$

$$C_{Bxz} = \frac{9Et^3}{50T^2 + 93h^2L_{RF}^2} \sqrt{\beta}$$

$$C_{Byz} = \frac{9Et^3}{200T^2 + 93h^2L_{RF}^2} \sqrt{\beta}$$

$$K_{Bx} = \frac{Et^3}{42.6T^3(1 + v + \frac{L_{RF}}{R})} \sqrt{\beta}$$

$$K_{By} = \frac{Et^3}{129T^3(R + 1 + L_{RF})h^2} \sqrt{\beta}$$

$$K_{Bz} = \frac{Et^3}{50T + 12L_{RF}h} \sqrt{\beta}$$

Stress
Determinative for the stroke $\theta_y$:
$$\sigma_{max}^* = 0.58E \sqrt{\beta} * \theta_y$$  * s-shape

$$\sigma_{max}^{**} = 0.58E \sqrt{\beta} * \frac{\theta_y}{2}$$  ** c-shape