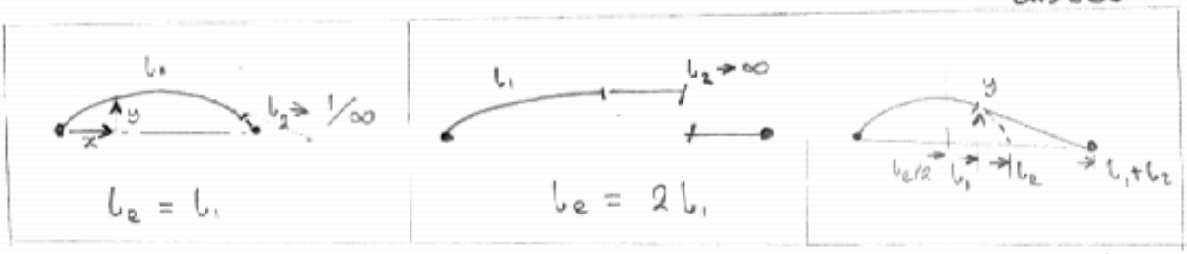
Buckling Effective Length of Hydraulic Ram

BAS 003



$y = a \cdot \sin(\pi x / b_e)$, $dy/dx = (a\pi/b_e)\cos(\pi x/b_e)$

$b_e = b_1(2 - b_1/(b_1+b_2))$ without account for sin function. ✓

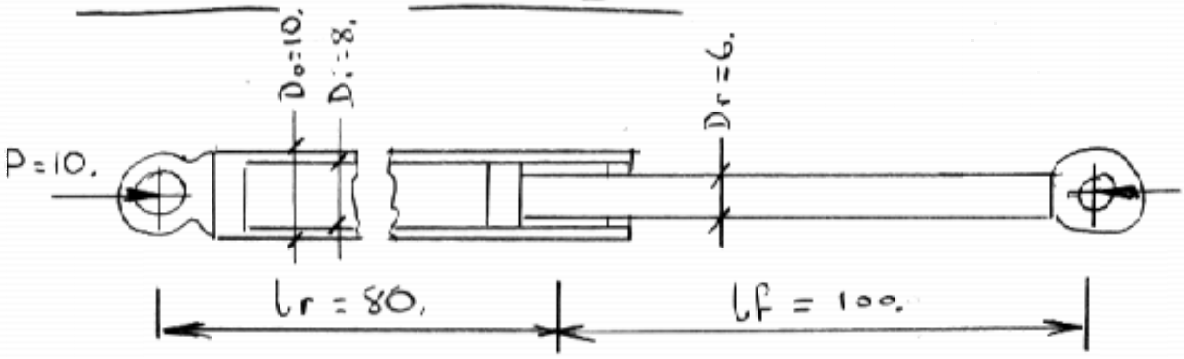
Match gradients,

$(a\pi/b_e)\cos(\pi b_1/b_e) = -a \cdot \sin(\pi b_1/b_2) / b_2$

$\tan(\pi b_1/b_e) = b_2\pi/b_e$

$\tan(\pi b_1/b_e) + b_2\pi/b_e = 0$

Solve for b_e when b_1 & b_2 are prescribed.



Do	Di	Dr
10.	8.	6.

Case	P	Lf	Lr
1	10	100.	80.

Case	p	fh	fdL	fdr	Le
1	.455	2.072	.354	.354	115.

$f_{dr} = 10\,(4/(\pi\,6^2)) = .354$

$p = 10\,(4/(\pi\,(8^2-6^2))) = .455$

$f_{dL} = 10\,(4/(\pi\,(10^2-8^2))) = .354$

$f_h = .455\,(10^2+8^2)^2/(10^2-8^2)^2 = 2.073$