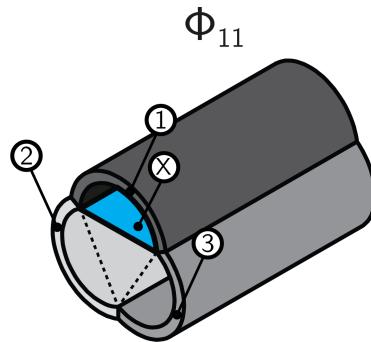


# View Factor 20

The image shows a combination of three long equal semicircles (cross-sectional area of three equal half cylinders). Determine the view factor  $\Phi_{11}$ :



One could think of a diagonal auxiliary plane  $X$ .

A flat plate can never see itself and therefore:

$$\Phi_{XX} = 0$$

From the summation rule of the top of the auxiliary plane  $X$  ( $\Phi_{XX} + \Phi_{X1} = 1$ ), it yields:

$$\Phi_{X1} = 1 - \Phi_{XX} = 1$$

Using the reciprocity rule it yields that ( $A_1\Phi_{1X} = A_X\Phi_{X1}$ ):

$$\Phi_{1X} = \Phi_{X1} \frac{A_X}{A_1} = \frac{DL}{\frac{1}{2}\pi DL} = \frac{2}{\pi}$$

Where  $D$  and  $L$  are the respective width/diameter and length of surfaces 1 and  $X$ .

From the summation rule ( $\Phi_{11} + \Phi_{1X} = 1$ ) it can be found that:

$$\Phi_{11} = 1 - \Phi_{1X} = 1 - \frac{2}{\pi}$$