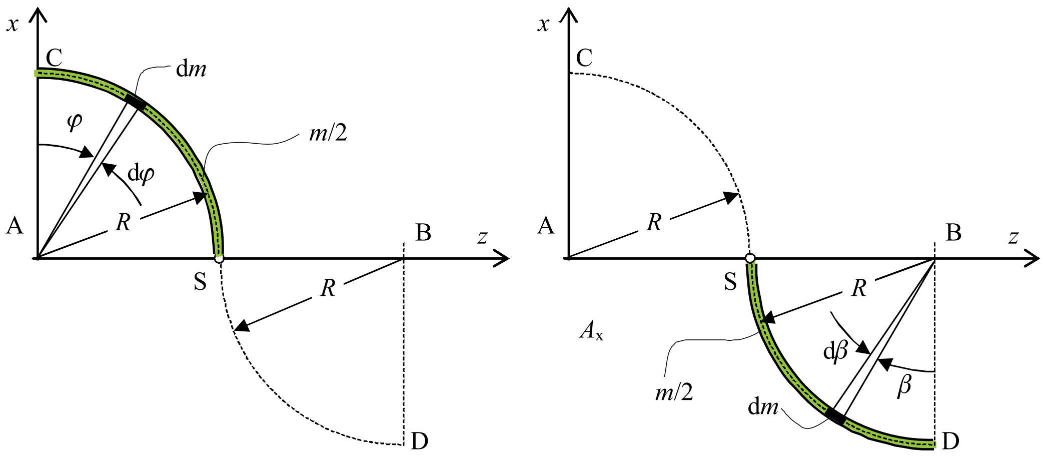

Slika 5.3.10 *Dopunske reakcije uz primjer 5.8 i način integriranja*

Dio luka $\overset{\frown}{\mathrm{CS}}$: diferencijal mase moguće je izračunati preko ukupne mase luka

$$\overset{\frown}{\mathrm{CS}}: \ \frac{dm}{ds}=\frac{\frac{m}{2}}{\frac{R\pi}{2}}=\frac{m}{R\pi} \ \text{ te slijedi: } \mathrm{d}m=\frac{m}{R\pi}\mathrm{d}s=\frac{m}{R\pi}R\mathrm{d}\varphi=\frac{m}{\pi}\mathrm{d}\varphi \,.$$

Koordinata x diferencijala mase dm: $x = R\cos\varphi$ dok je koordinata $z = R\sin\varphi$ što nakon uvrštavanja daje:

$$\left(J_{zx}\right)_1=\int_{(m)} xz\mathrm{d}m=\int_0^{\pi/2} R\cos\varphi\cdot R\sin\varphi\cdot\frac{m}{\pi}\mathrm{d}\varphi\,,\ \left(J_{zx}\right)_1=\frac{m}{\pi}R^2\int_0^{\pi/2}\cos\varphi\sin\varphi\mathrm{d}\varphi\,,$$

$$\left(J_{zx}\right)_1=\frac{m}{2\pi}R^2\int_0^{\pi/2}\sin 2\varphi\mathrm{d}\varphi\,,\ \left(J_{zx}\right)_1=\frac{m}{2\pi}R^2\left(-\frac{1}{2}\cos 2\varphi\right)\Bigg|_0^{\pi/2},$$

$$\left(J_{zx}\right)_1=\frac{m}{2\pi}R^2\left((-\frac{1}{2})\cdot(-1)-(-\frac{1}{2})\cdot(+1)\right)\Bigg|_0^{\pi/2}=\frac{m}{2\pi}R^2\,.$$

Dio luka $\overset{\frown}{\mathrm{SD}}$: diferencijal mase moguće je slično izračunati preko ukupne mase luka $\overset{\frown}{\mathrm{SD}}$: $\dfrac{dm}{ds}=\dfrac{m}{R\pi}$ te slijedi: $\mathrm{d}m=\dfrac{m}{R\pi}\mathrm{d}s=\dfrac{m}{R\pi}R\mathrm{d}\beta=\dfrac{m}{\pi}\mathrm{d}\beta$. Koordinata x diferencijala mase dm: $z = 2R - R\cos\beta$ dok je koordinata $x = -R\sin\beta$ što nakon uvrštavanja daje:

$$\left(J_{zx}\right)_2=\int_{(m)} xz\mathrm{d}m\,,\ \left(J_{zx}\right)_2=\int_0^{\pi/2}\left(-R\sin\beta\right)\cdot\left(2R-R\cos\beta\right)\cdot\frac{m}{\pi}\mathrm{d}\beta\,,$$

$$\left(J_{zx}\right)_2=\frac{2m}{\pi}R^2\int_0^{\pi/2}\left(-\sin\beta\right)\mathrm{d}\beta+\frac{m}{2\pi}R^2\int_0^{\pi/2}\sin 2\beta\mathrm{d}\beta\,,\ \left(J_{zx}\right)_2=-\frac{2m}{\pi}R^2+\frac{m}{2\pi}R^2\,,$$

$$J_{zx}=\left(J_{zx}\right)_1+\left(J_{zx}\right)_2=-\frac{m}{\pi}R^2\,.\ \ F_{\mathrm{B}x}=\frac{\omega^2 J_{xz}}{2R}=\frac{m}{\pi}R^2\frac{\omega^2}{2R}=\frac{mR\omega^2}{2\pi}\ \text{/N}\,,$$

Prema i) $F_{\mathrm{B}x}=-F_{\mathrm{A}x}$ slijedi $F_{\mathrm{A}x}=-\dfrac{mR\omega^2}{2\pi}$ /N .