Adicijski teoremi - Formule

1. **Kosinus i sinus zbroja i razlike**[1]

$$\cos(s+t) = \cos s \cos t - \sin s \sin t$$
$$\cos(s-t) = \cos s \cos t + \sin s \sin t$$
$$\sin(s+t) = \sin s \cos t + \cos s \sin t$$
$$\sin(s-t) = \sin s \cos t - \cos s \sin t$$

2. **Formule redukcije za sinus i kosinus funkcije**

$$\cos\left(\frac{\pi}{2}-t\right) = \sin t \qquad \sin\left(\frac{\pi}{2}-t\right) = \cos t$$
$$\cos\left(\frac{\pi}{2}+t\right) = -\sin t \qquad \sin\left(\frac{\pi}{2}+t\right) = \cos t$$
$$\cos\left(\pi-t\right) = -\cos t \qquad \sin\left(\pi-t\right) = \sin t$$
$$\cos\left(\pi+t\right) = -\cos t \qquad \sin\left(\pi+t\right) = -\sin t$$

3. **Tangens i kotangens zbroja i razlike funkcija**

$$\tan(s+t) = \frac{\tan s + \tan t}{1 - \tan s \cdot \tan t}$$
$$\tan(s-t) = \frac{\tan s - \tan t}{1 + \tan s \cdot \tan t}$$
$$ctg(s+t) = \frac{ctg\ s \cdot ctg\ t - 1}{ctg\ s + ctg\ t}$$
$$ctg(s-t) = \frac{ctg\ s \cdot ctg\ t + 1}{ctg\ s - ctg\ t}$$

4. **Formule redukcije za tangens i kotangens**

$$\tan\left(\frac{\pi}{2}-t\right) = ctg\ t \qquad ctg\ \left(\frac{\pi}{2}-t\right) = \tan t$$
$$\tan\left(\frac{\pi}{2}+t\right) = -ctg\ t \qquad ctg\ \left(\frac{\pi}{2}+t\right) = -\tan t$$

5. **Trigonometrijske funkcije dvostrukog kuta**

$$\sin 2\alpha = 2 \sin\alpha \cos\alpha$$
$$\cos 2\alpha = cos^2\alpha - \sin^2\alpha$$
$$\tan 2\alpha = \frac{2\tan\alpha}{1-\tan^2\alpha}$$
$$ctg\ 2\alpha = \frac{ctg^2\alpha - 1}{2ctg\alpha}$$

[1] Ivica Đuzel, prof. matematike i informatike

6. **Još dvije korisne formule**

$$\sin^2\alpha = \frac{1-\cos\alpha}{2}$$
$$\cos^2\alpha = \frac{1+\cos\alpha}{2}$$

7. **Sinus i kosinus polovičnog kuta**

$$\sin\frac{\alpha}{2} = \sqrt{\frac{1-\cos\alpha}{2}}$$
$$\cos\frac{\alpha}{2} = \sqrt{\frac{1+\cos\alpha}{2}}$$

8. **Univerzalna zamjena**

$$\sin\alpha = \frac{2\tan\frac{\alpha}{2}}{1+\tan^2\frac{\alpha}{2}} \qquad \cos\alpha = \frac{1-\tan\frac{\alpha}{2}}{1+\tan^2\frac{\alpha}{2}} \qquad \tan\alpha = \frac{2\tan\frac{\alpha}{2}}{1-\tan^2\frac{\alpha}{2}}$$

9. **Transformacija umnoška u zbroj**

$$\sin x\cos y = \frac{1}{2}\left[\sin(x+y)+\sin(x-y)\right]$$
$$\cos x\sin y = \frac{1}{2}\left[\sin(x+y)-\sin(x-y)\right]$$
$$\cos x\cos y = \frac{1}{2}\left[\cos(x+y)+\cos(x-y)\right]$$
$$\sin x\sin y = \frac{1}{2}\left[\cos(x-y)-\cos(x+y)\right]$$

10. **Transformacija zbroja u umnožak**[2]

$$\sin\alpha+\sin\beta = 2\sin\frac{\alpha+\beta}{2}\cos\frac{\alpha-\beta}{2}$$
$$\sin\alpha-\sin\beta = 2\cos\frac{\alpha+\beta}{2}\sin\frac{\alpha-\beta}{2}$$
$$\cos\alpha+\cos\beta = 2\cos\frac{\alpha+\beta}{2}\cos\frac{\alpha-\beta}{2}$$
$$\cos\alpha-\cos\beta = -2\sin\frac{\alpha+\beta}{2}\sin\frac{\alpha-\beta}{2}$$

[2] Ivica Đuzel, prof. matematike i informatike