

# Matematik-Bilgisayar Bilimleri

Deniz Balcı

Mayıs 31, 2019

## 1 Trigonometrik değerlerin türevi ve integrali

### Trigonometrik fonksiyonların integrali

$$\begin{aligned}\int \sin(u)du &= -\cos u \\ \int \cos(u)du &= \sin u \\ \int \tan(u)du &= \ln \sec u = -\ln \cos u \\ \int \cot(u)du &= \ln \sin u \\ \int \sec(u)du &= \ln(\sec u + \tan u) = \ln(u/2 + \pi/2) \\ \int \csc(u)du &= \ln(\csc u - \cot u) = \ln \tan(u/2)\end{aligned}$$

### Ters Trigonometrik fonksiyonların integrali

$$\begin{aligned}\int \arctan(x)dx &= x \arctan(x) - \frac{1}{2} \ln(1+x^2) + C \\ \int \operatorname{arccot}(x)dx &= x \operatorname{arccot}(x) + \frac{1}{2} \ln(1+x^2) + C \\ \int \arcsin(x)dx &= x \arcsin(x) + \sqrt{1-x^2} + C \\ \int \arccos(x)dx &= x \arccos(x) - \sqrt{1-x^2} + C \\ \int \operatorname{arccsc}(x)dx &= x \operatorname{arccsc}(x) + \ln(\sqrt{x^2-1} + x) + C \\ \int \operatorname{arcsec}(x)dx &= x \operatorname{arcsec}(x) - \ln(\sqrt{x^2-1} + x) + C\end{aligned}$$

## Hiperbolik fonksiyonların integralleri

$$\int \sinh(x)dx = \cosh(x) + C$$

$$\int \cosh(x)dx = \sinh(x) + C$$

$$\int \coth(x)dx = \ln|\sinh(x)| + C$$

$$\int \tanh(x)dx = \ln(\cosh(x)) + C$$

$$\int \operatorname{csch}(x)dx = \ln|\tanh(\frac{x}{2})| + C$$

$$\int \operatorname{sech}(x)dx = \arctan(\sinh(x)) + C$$

## 2 Trigonometrik ve ters trigonometrik değerlerin türevi

### Trigonometrik fonksiyonların türevi

$$\frac{d}{dx} \sin(x) = \cos(x)$$

$$\frac{d}{dx} \cos(x) = -\sin(x)$$

$$\frac{d}{dx} \tan(x) = \frac{1}{\cos^2(x)} = \sec^2(x)$$

$$\frac{d}{dx} \cot(x) = -\frac{1}{\sin^2(x)} = -\operatorname{csc}^2(x)$$

$$\frac{d}{dx} \csc(x) = -\csc(x)\cot(x)$$

$$\frac{d}{dx} \sec(x) = \tan(x)\sec(x)$$

### Ters Trigonometrik fonksiyonların türevi

$$\frac{d}{dx} \arcsin(x) = \frac{1}{\sqrt{1-x^2}}$$

$$\frac{d}{dx} \arccos(x) = \frac{-1}{\sqrt{1-x^2}}$$

$$\frac{d}{dx} \arctan(x) = \frac{1}{1+x^2}$$

$$\frac{d}{dx} \operatorname{arccot}(x) = \frac{-1}{1+x^2}$$

$$\frac{d}{dx} \operatorname{arcsec}(x) = \frac{1}{|x|\sqrt{x^2-1}}$$

$$\frac{d}{dx} \operatorname{arccsc}(x) = \frac{-1}{|x|\sqrt{x^2-1}}$$

### Hiperbolik fonksiyonların türevi

$$\frac{d}{dx} \sinh(x) = \cosh(x)$$

$$\frac{d}{dx} \cosh(x) = \sinh(x)$$

$$\frac{d}{dx} \tanh(x) = \operatorname{sech}^2(x)$$

$$\begin{aligned}\frac{d}{dx} \coth(x) &= -\operatorname{csch}^2(x) \\ \frac{d}{dx} \operatorname{sech}(x) &= -\operatorname{sech}(x) \tanh(x) \\ \frac{d}{dx} \operatorname{csch}(x) &= -\operatorname{csch}(x) \coth(x)\end{aligned}$$