

Fira Math

Sans-serif font with Unicode math support

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Basic examples (I)

- Covariant derivative:

$$\nabla X = X^\alpha_{;\beta} \frac{\partial}{\partial x^\alpha} \otimes dx^\beta = \left(X^\alpha_{,\beta} + \Gamma^\alpha_{\beta\gamma} X^\gamma \right) \frac{\partial}{\partial x^\alpha} \otimes dx^\beta$$

- Einstein's field equations:

$$G_{\mu\nu} \equiv R_{\mu\nu} - \frac{1}{2}Rg_{\mu\nu} = \frac{8\pi G}{c^4}T_{\mu\nu}$$

- Schwarzschild metric:

$$c^2 d\tau^2 = \left(1 - \frac{r_s}{r}\right) c^2 dt^2 - \left(1 - \frac{r_s}{r}\right)^{-1} dr^2 - r^2 \underbrace{\left(d\theta^2 + \sin^2 \theta d\varphi^2\right)}_{d\Omega^2}$$

- Einstein–Hilbert action:

$$S = \frac{1}{2\kappa} \int R \sqrt{-g} d^4x$$

Basic examples (II)

- Case $n = 1$

$$\int_0^{\frac{\pi}{2}} \frac{\sqrt{\frac{1}{2} \sqrt{\frac{\ln^2 \cos \theta}{\theta^2 + \ln^2 \cos \theta}} + \frac{1}{2}}}{\sqrt[4]{\theta^2 + \ln^2 \cos \theta}} d\theta = \frac{\pi}{2\sqrt{\ln 2}}$$

- Generalization:

$$\left\{ \begin{array}{l} R_n^- = \frac{2}{\pi} \int_0^{\pi/2} (\theta^2 + \ln^2 \cos \theta)^{-2^{-n-1}} \sqrt{\frac{1}{2} + \frac{1}{2} \sqrt{\frac{1}{2} + \dots + \frac{1}{2} \sqrt{\frac{\ln^2 \cos \theta}{\theta^2 + \ln^2 \cos \theta}}}} d\theta = (\ln 2)^{-2^{-n}} \\ R_n^+ = \frac{2}{\pi} \int_0^{\pi/2} (\theta^2 + \ln^2 \cos \theta)^{2^{-n-1}} \sqrt{\frac{1}{2} + \frac{1}{2} \sqrt{\frac{1}{2} + \dots + \frac{1}{2} \sqrt{\frac{\ln^2 \cos \theta}{\theta^2 + \ln^2 \cos \theta}}}} d\theta = (\ln 2)^{2^{-n}} \end{array} \right.$$

Using with CJK fonts

- 【留数定理】全純函数 f 在若尔当曲线 γ 上的积分为：

$$\oint_{\gamma} f(z) dz = 2\pi i \sum_{k=1}^n \text{Res}_{z=a_k} f(z).$$

- 【留數定理】全純函數 f 在若爾當曲線 γ 上的積分為：

$$\oint_{\gamma} f(z) dz = 2\pi i \sum_{k=1}^n \text{Res}_{z=a_k} f(z).$$

- 【留数定理】ジョルダン曲線 γ に沿う正則関数 f の積分は、

$$\oint_{\gamma} f(z) dz = 2\pi i \sum_{k=1}^n \text{Res}_{z=a_k} f(z).$$

Multiple weights (preview)

$$\frac{\partial}{\partial \alpha} \sin \alpha = \cos \alpha$$

$$\frac{\partial}{\partial \beta} \cos \beta = -\sin \beta$$

$$\frac{\partial}{\partial \gamma} \tan \gamma = \sec^2 \gamma$$

$$\frac{\partial}{\partial \theta} \cot \theta = -\csc^2 \theta$$

$$\frac{\partial}{\partial \phi} \sec \phi = \tan \phi \sec \phi$$

$$\frac{\partial}{\partial \zeta} \csc \zeta = -\cot \zeta \csc \zeta$$

$$\int \sin x \, dx = -\cos x + C_1$$

$$\int \cos y \, dy = \sin y + C_2$$

$$\int \tan z \, dz = -\ln |\cos z| + C_3$$

$$\int \cot p \, dp = \ln |\sin p| + C_4$$

$$\int \sec q \, dq = \ln |\sec q + \tan q| + C_5$$

$$\int \csc r \, dr = -\ln |\csc r + \cot r| + C_6$$