

Oct 2, 2012

Matr 267 (tut)

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Find extremals of $\int_a^b \frac{(y')^2}{x^3} dx$

$$F(x, y, x') = \frac{(y')^2}{x^3}$$

$$\underline{E-L} : \frac{d}{dx} F_{y'} = F_y \Rightarrow \frac{d}{dx} \frac{2y'}{x^3} = 0$$

$$\Rightarrow \frac{2y'}{x^3} = C_1$$

$$\Rightarrow 2y' = C_1 x^3$$

$$\Rightarrow y' = C_2 x^3$$

$$\Rightarrow y = C_3 x^4 + C_4$$

U_n uniformly convergent to u and f is K -Lipschitz then $f \circ U_n$ is uniform convergent to $f \circ u$.

Let $\varepsilon > 0 \exists N, n \geq N \forall x |f(U_n(x)) - f(u(x))| < \varepsilon$.

$$|f(U_n(x)) - f(u(x))| \leq K |U_n(x) - u(x)|$$

$$\leq K \cdot \frac{\varepsilon}{K}$$

$$= \varepsilon$$