EEM Kısa Sınav-1 (21.10.14)

E.E.M. (Mat-I) K.S. (1) ikinci öğretim

$$\lim_{x\to 0} \frac{2^{\sin x}-1}{\ln(1+3x)} = \lim_{x\to 0} \frac{2^{\sin x}-1}{\sin x} \cdot \lim_{x\to 0} \frac{\sin x}{\ln(1+3x)}$$

$$= \underbrace{\lim_{x\to 0} \frac{\sin x}{x}}_{=1} \cdot \underbrace{\frac{1}{3}\lim_{3x\to 0} \frac{3x}{\ln(1+3x)}}_{=1/3} \cdot \lim_{x\to 0} \frac{2^{\sin x}-1}{\sin x}$$

$$= \frac{1}{3} \lim_{x\to 0} \frac{2^{\sin x}-1}{\sin x} = \left\{ \begin{array}{l} 2^{\sin x} = e^{t} \\ x\to 0 \Rightarrow t\to 0 \\ \sin x = \frac{t}{\ln 2} \end{array} \right\}$$

$$= \frac{1}{3} \cdot \lim_{t\to 0} \frac{e^{t}-1}{\frac{t}{\ln 2}} = \frac{\ln 2}{3} \cdot \underbrace{\lim_{t\to 0} \frac{e^{t}-1}{t}}_{=1} = \frac{\ln 2}{3}$$