Lecture 10

Thursday, April 20, 2023 1:47 AM

* Questions ...

Solve the inequality $\dfrac{150}{1+29e^{-0.8t}} \le 130$

Let $x = e^{-0.8t}$

$$\frac{150}{1+29x} \le 130 \iff \frac{15}{1+29x} \le 13$$

$$\iff \frac{15}{1+29x} - 13 \le 0 \iff \frac{15-13(1+29x)}{1+29x} \le 0$$

$$\iff \frac{2-377x}{1+29x} \le 0$$

x		$-\frac{1}{29}$		$\frac{2}{377}$	
$1+29x$	$-$	0	$+$		$+$
$2-377x$	$+$		$+$	0	$-$
$\frac{2-377x}{1+29x}$	$-$	‖	$+$	0	$-$

$x \in \left(-\infty, -\frac{1}{29}\right) \cup \left[\frac{2}{377}, \infty\right)$

Because $x = e^{-0.8t} > 0$, we must have $x \in \left[\frac{2}{377}, \infty\right)$.

$$e^{-0.8t} \ge \frac{2}{377} \iff -0.8t \ge \ln\frac{2}{377}$$

$$\iff t \le \frac{\ln\frac{2}{377}}{-0.8}$$

$\Rightarrow t \in \left(-\infty, \underbrace{\frac{\ln \frac{2}{377}}{-0.8}}_{\approx 0.65\ldots}\right]$

Angles

Angle represents the openess between two rays.

There are two common systems of measurement of angles:

- DMS: degree - minute - second (commonly used in real life)
- radian: used in math

* Food for thought:

. Why are angles between $0°$ and $360°$? Why not between $0°$ and $100°$?

. Why is the fraction of angles measured in minute and second (just like time)?