



EX: Find $\lim_{t \rightarrow \infty} v(t)$ if $V(s) = \frac{10s^2 + 4}{s^3 + s^2 + s}$.

SOL'N: We use the final value theorem:

$$\lim_{t \rightarrow \infty} v(t) = \lim_{s \rightarrow 0} sV(s)$$

or

$$\lim_{t \rightarrow \infty} v(t) = \lim_{s \rightarrow 0} s \frac{10s^2 + 4}{s^3 + s^2 + s}$$

We cancel a factor of s from the top and bottom and substitute $s = 0$.

$$\lim_{t \rightarrow \infty} v(t) = \lim_{s \rightarrow 0} \frac{10s^2 + 4}{s^2 + s + 1} = 4$$