Ex: Find $\lim_{t \to 0^+} f(t)$ if $F(s) = \dfrac{s(9s-6)}{3(s^2+4)(s+2)}$.

Sol'n: We apply the initial value theorem:

$$\lim_{t \to 0^+} f(t) = \lim_{s \to \infty} sF(s)$$

Applying the theorem gives the following expression:

$$\lim_{t \to 0^+} f(t) = \lim_{s \to \infty} \frac{s^2(9s-6)}{3(s^2+4)(s+2)}$$

When we have s approaching infinity, we may ignore finite constants added to powers of s:

$$\lim_{t \to 0^+} f(t) = \lim_{s \to \infty} \frac{s^2(9s)}{3s^2 s} = \lim_{s \to \infty} \frac{9s^3}{3s^3}$$

We cancel the common factor of s^3 in the numerator and denominator:

$$\lim_{t \to 0^+} f(t) = \lim_{s \to \infty} \frac{9}{3} = \frac{9}{3} = 3$$

Note: We may ignore any additive terms that have lower powers of s than the highest power of s in that term. We never ignore the coefficient of the highest power of s, however.