UE PIC - Math Refresher Course

– Duration: 1h30 –

1) Compute the real and imaginary part of $z = \left(\dfrac{1+i}{2-i}\right)^2$.

2) Compute the trigonometric form of $z = \dfrac{-i\sqrt{2}}{1+i}$ and then compute the real and imaginary part of z^2.

3) Check that $x = -1$ is a root of $2x^3 - 10x^2 + 14x + 26$. Compute all the roots and write the factored form of the polynomial.

4) Write the developed form of a polynomial whose roots are: $x_1 = -3$, $x_2 = 2$, $x_3 = 1 + i$, $x_4 = 1 - i$.

5) Compute the partial fraction decomposition of:

$$\frac{x^2 - 2x - 37}{x^2 - 3x - 40}$$

6) Compute the following limits:

$$\lim_{x \to 5} \frac{3x + 2}{6x - 4}$$

$$\lim_{x \to 7} \frac{1}{x - 7}$$

$$\lim_{x \to +\infty} \frac{2x^2 + 5x + 1}{6x^2 - 5}$$

$$\lim_{x \to 5} \frac{\sqrt{x - 1} - 2}{x - 5}$$

7) Using the Laplace transform solve the following differential equation:

$$\dot{y}(t) = y(t) + te^t$$

with : $y(0^-) = -1$