. .

BAB I

KESIMPULAN

Solusi sistem persamaan diferensial *fractional*

$$\frac{d^{\alpha}\mathbf{x}(t)}{dt^{\alpha}} = A\mathbf{x}(t) + B\mathbf{u}(t),\ \mathbf{x}(0) = \mathbf{x}_0, m-1 < \alpha < m, m \in \mathbb{N},$$

dimana $A \in \mathbb{R}^{n\times n}$, $B \in \mathbb{R}^{n\times m}$, $\mathbf{u}(t) \in \mathbb{R}^{m}$ dan $\frac{d^{\alpha}\mathbf{x}(t)}{dt^{\alpha}}$ adalah turunan *fractional* tipe Caputo orde α dari $\mathbf{x}(t)$, dengan $m-1 < \alpha < m$, $m \in \mathbb{N}$ adalah

$$\mathbf{x}(t) = \sum_{k=1}^{m} \Phi_k(t)\mathbf{x}^{(k-1)}(0) + \int_0^t \Phi(t-\tau)B\mathbf{u}(\tau)d\tau,$$

dimana

$$\Phi_k(t) = \sum_{n=0}^{\infty} A^n \mathcal{L}^{-1}\left[s^{-(\alpha n+k)}\right] = \sum_{n=0}^{\infty} \frac{A^n t^{(n\alpha+k)-1}}{\Gamma(n\alpha+k)},$$

$$\Phi\ (t) = \sum_{n=0}^{\infty} A^n \mathcal{L}^{-1}[s^{-(n+1)\alpha}] = \sum_{n=0}^{\infty} \frac{A^n t^{(n+1)\alpha-1}}{\Gamma(n+1)\alpha}.$$