

$$\underbrace{\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \\ \dot{x}_3 \end{bmatrix}}_{\dot{x}} = \underbrace{\begin{bmatrix} 1 & x_1 & x_2 & x_3 & x_1 x_2 & x_1^2 & x_1 x_3 & \cdots & x_3^2 \end{bmatrix}}_{\phi(x)} \underbrace{\begin{bmatrix} \beta^1 & \beta^2 & \beta^3 \end{bmatrix}}_{\beta} + \varepsilon$$

The diagram illustrates a polynomial expansion of a vector field. The vector field \dot{x} is represented by a column vector with three components: \dot{x}_1 (blue), \dot{x}_2 (red), and \dot{x}_3 (green). This is equated to the product of a polynomial vector $\phi(x)$ and a parameter vector β , plus a residual term ε .

The polynomial vector $\phi(x)$ is a row vector with terms: 1 , x_1 , x_2 , x_3 , $x_1 x_2$, x_1^2 , $x_1 x_3$, \dots , and x_3^2 . These terms are represented by gray vertical bars.

The parameter vector β is a row vector with three components: β^1 (blue), β^2 (red), and β^3 (green). Each component is represented by a vertical bar containing three small circles.

The residual term ε is shown as a small vector with three components, represented by three small circles.