3. ÖDEV **Sinem Tetik 502341005**

İleri farklar kullanarak 5. türev ifadesini elde ediniz.

$$y_{i+1} = y_i + hy_i' + \frac{h^2}{2!}y_i'' + \frac{h^3}{3!}y_i''' + \frac{h^4}{4!}y_i^{(iv)} + \frac{h^5}{5!}y_i^{(v)} + \ldots \rightarrow (A) = 5$$

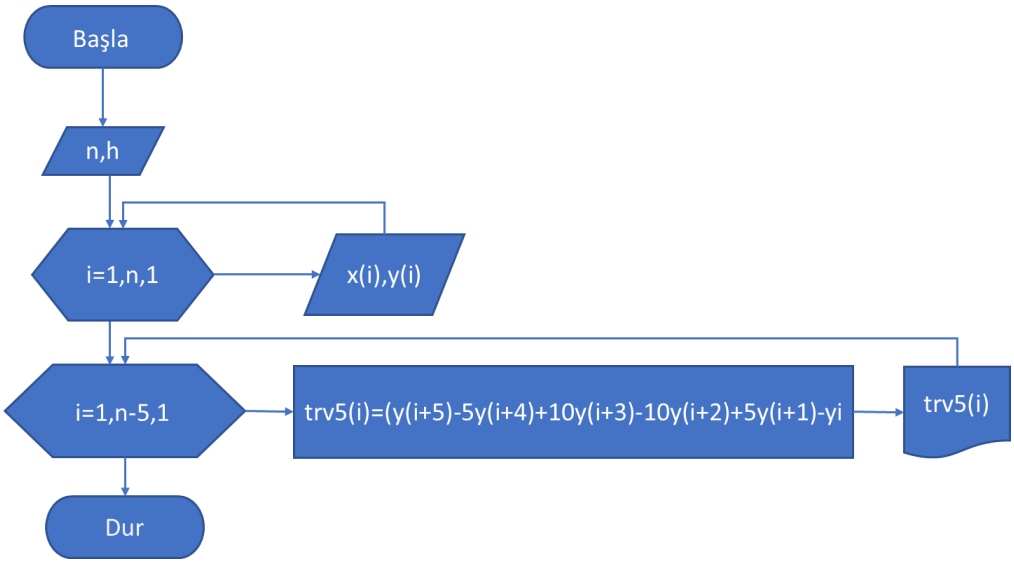
$$y_{i+2} = y_i + 2hy_i' + \frac{4h^2}{2!}y_i'' + \frac{8h^3}{3!}y_i''' + \frac{16h^4}{4!}y_i^{(iv)} + \frac{32h^5}{5!}y_i^{(v)} + \ldots \rightarrow (B) = -10$$

$$y_{i+3} = y_i + 3hy_i' + \frac{9h^2}{2!}y_i'' + \frac{27h^3}{3!}y_i''' + \frac{81h^4}{4!}y_i^{(iv)} + \frac{243h^5}{5!}y_i^{(v)} + \ldots \rightarrow (C) = 10$$

$$y_{i+4} = y_i + 4hy_i' + \frac{16h^2}{2!}y_i'' + \frac{64h^3}{3!}y_i''' + \frac{256}{4!}y_i^{(iv)} + \frac{1024}{5!}h^5 y_i^{(v)} + \ldots \rightarrow (D) = -5$$

$$y_{i+5} = y_i + 5hy_i' + \frac{25h^2}{2!}y_i'' + \frac{125h^3}{3!}y_i''' + \frac{625h^4}{4!}y_i^{(iv)} + \frac{3125}{5!}h^5 y_i^{(v)} + \ldots \rightarrow (E) = 1$$

$$y_i^{(v)} = \frac{1}{h^5}\{y_{i+5} - 5y_{i+4} + 10y_{i+3} - 10y_{i+2} + 5y_{i+1} - y_i\}$$



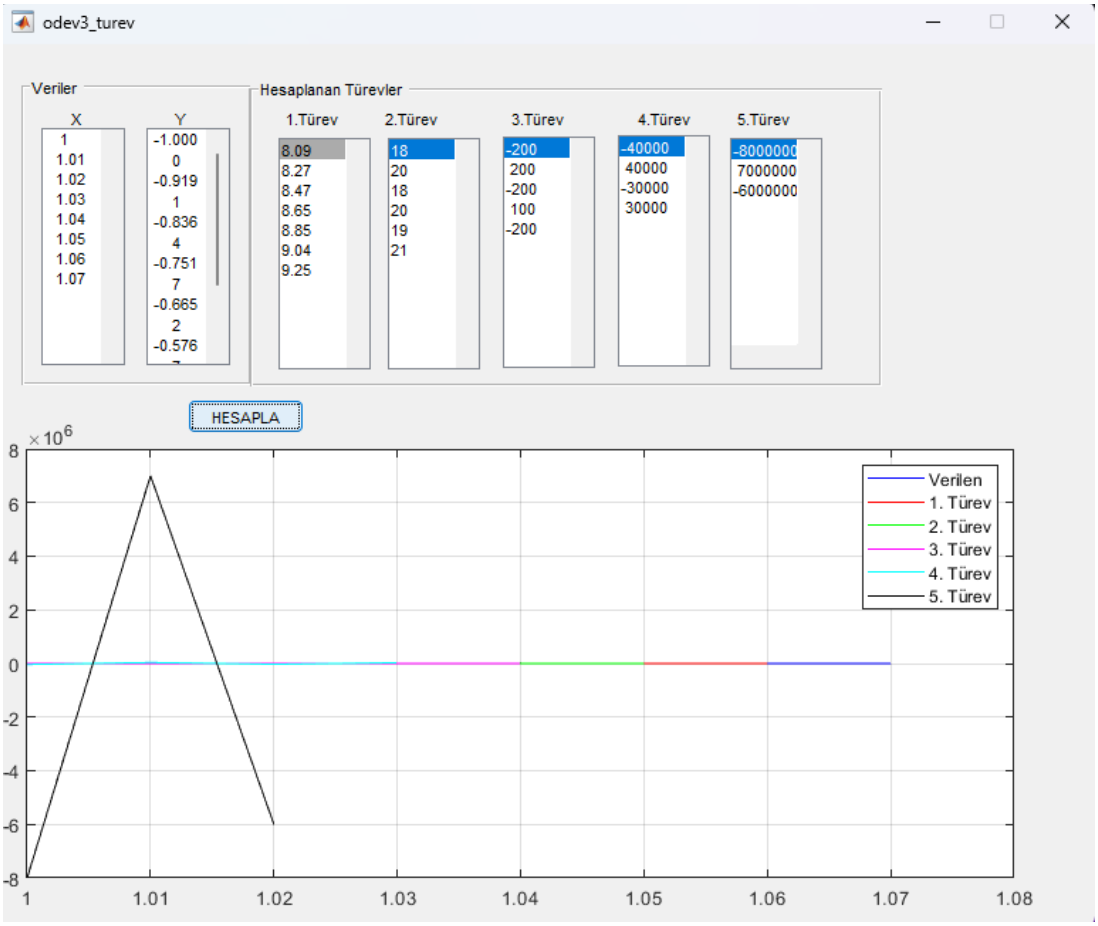
Şekil 1. Akış Diyagramı

Bir Örnek

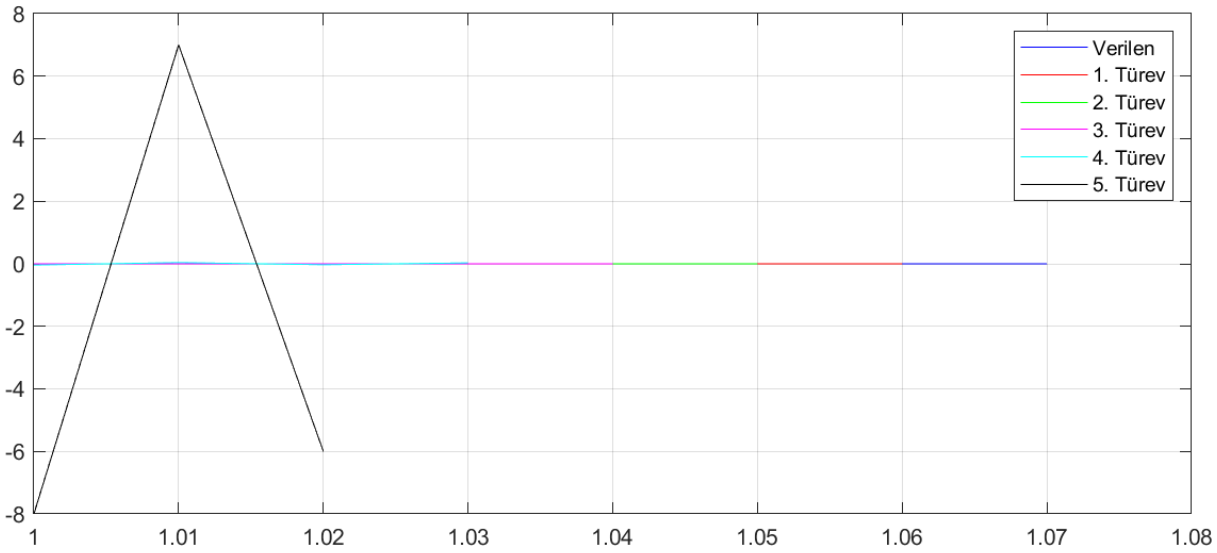
$y=x^4+2x^3-3x^2+4x-5$ fonksiyonu için ileri farklarla 5. türev formülü kullanarak h=0.01 adımlarla [1,1.07] aralığındaki türevlerini hesaplayalım.

x	y
1	-1.0000
1.01	-0.9191
1.02	-0.8364
1.03	-0.7517
1.04	-0.6652
1.05	0.5767
1.06	-0.4863
1.07	-0.3938

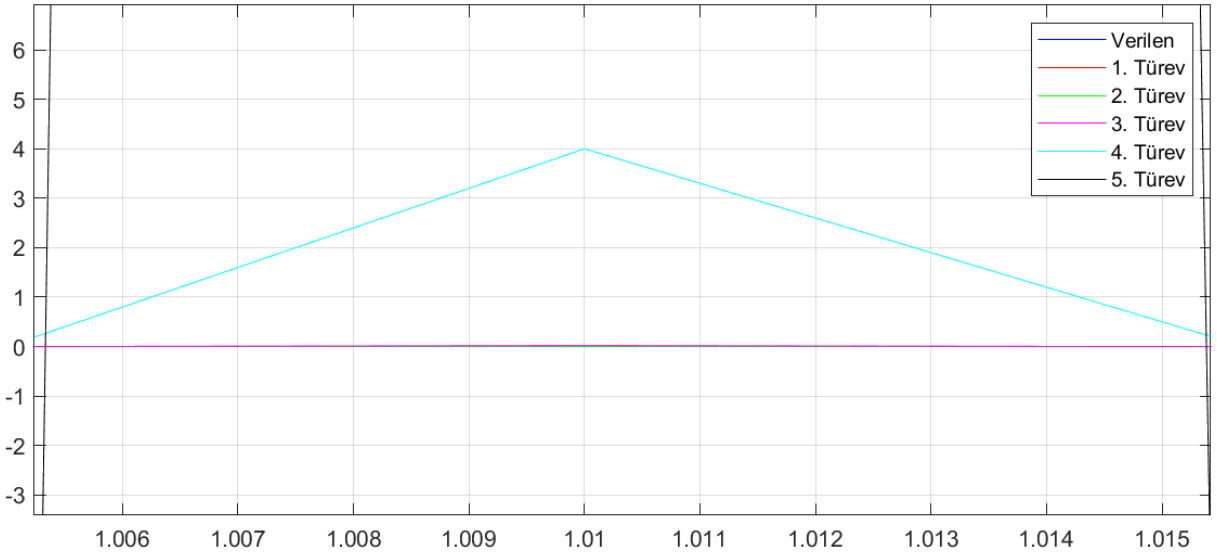
MATLAB GUI UYGULAMASI



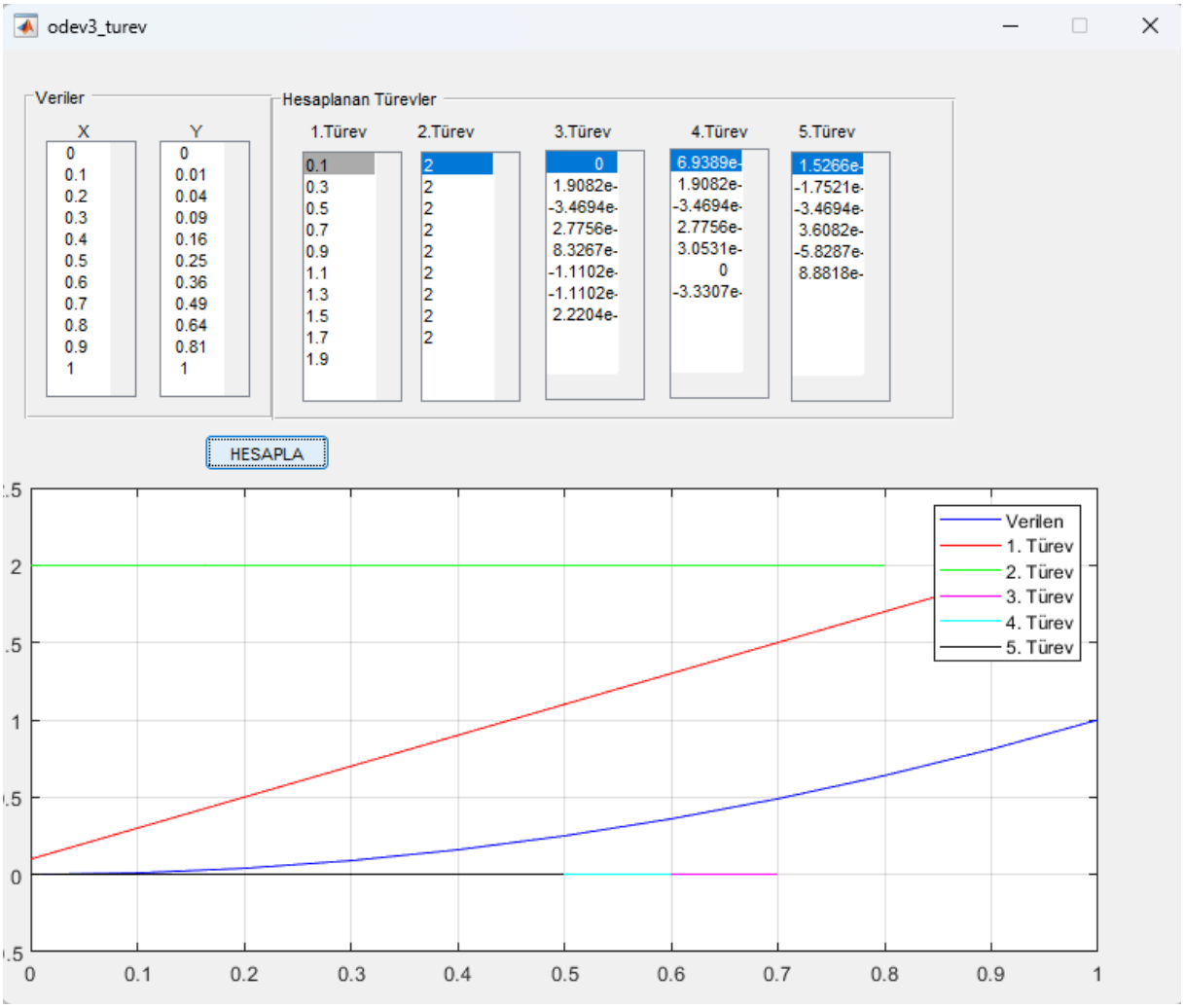
Şekil 2. MATLAB GUI Uygulaması



Şekil 3. Türev Grafiği (5.Türev)



Şekil 4. Türev Grafiği (4. Türev)



Şekil 5. MATLAB GUI Uygulaması Farklı Örnek