

1.11 Use MATLAB to determine the parameters α , β , and γ that produce the least-squares fit of the data in Fig. 1.4 to the curves $y(u) = \alpha \tan^{-1}(\beta u)$ and $y(u) = \gamma u$. Compare your answers with Figs. 1.5 and 1.6.

1.12 Compute the first-order Taylor series expansion of the function $y(u) = \alpha \tan^{-1}(\beta u)$ about $u = 0$ and use the solution to P1.11 to verify the value of the slope shown in Fig. 1.6.

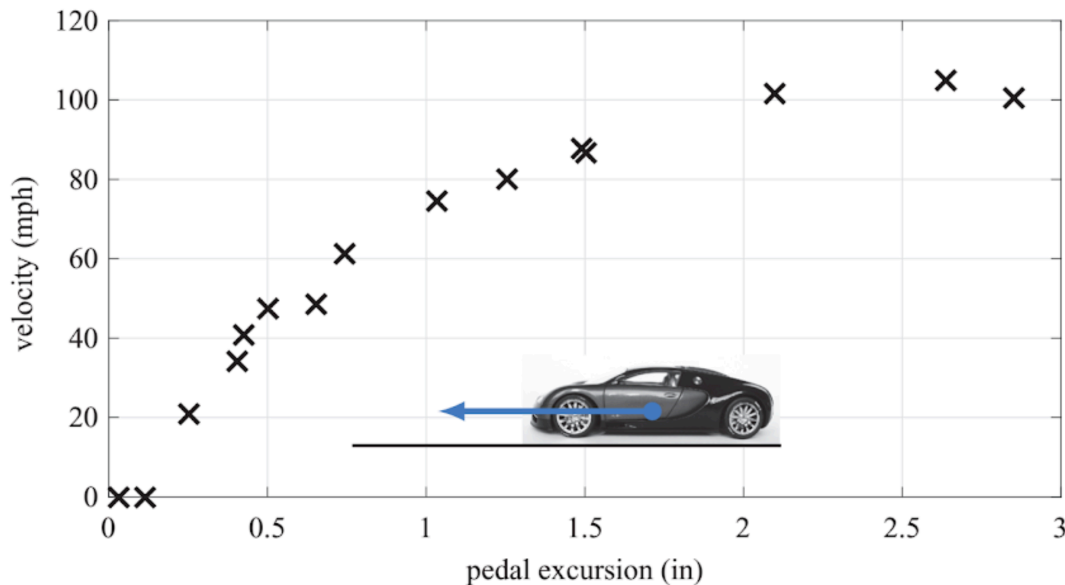


Figure 1.4 Experimental determination of the effect of pressing the gas pedal on the car's terminal velocity; the pedal excursion is the input signal, u , and the car's terminal velocity is the output signal, y .