Normal Takeoff for Runway Calculations

Normal Boeing 777 Takeoff

[Graph showing takeoff performance metrics for a Boeing 777 aircraft. The graph plots velocity (Vtue) against time (real time) with labels indicating specific points and values.]
Process:

1. Plot True Airspeed and Altitude above ground
2. Add Event Markers for the takeoff start and at 30 feet to obtain numeric values at that time.
3. Calc acceleration as follows:
   a. Convert MPH to ft/s for the two speeds
      i. 197.2 MPH = 289.2 ft/s; 23.0 MPH = 33.7 ft/s
   b. $a = \frac{\Delta V}{\Delta t}$
      c. $a = \frac{(289.2-33.7)}{(120.1-82.3)} = 6.8 \text{ feet/sec}^2$
4. Calculate distance $S = \frac{1}{2} at^2 = \frac{1}{2} \times 6.8 \times (120.1-82.3)^2 = 4858 \text{ ft.}$