



## JETS Challenge 120

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### A Traffic Jam

Inspection of a freeway data set reveals a free flow speed of  $v_f = 60$  mph, a jam density of  $k_j = 180$  vehicles per mile per lane, and an observed maximum flow of 2000 vehicles per hour.

Greenshield's Model  $v_m = v_f - v_f/k_j k$  (mph).  $k = k_j/2$  half of jam density

Density is  $q = v_m k$

**The Challenge: determine the speed  $v_m$  and density  $q$  at maximum flow conditions. Compare theoretical density to observed maximum flow.**

$$v_s = v_f - v_f/k_j k \text{ (mph)}$$

$$v_s = 60 - 60/180 k = 60 - 0.333k$$

$$k = 90.0 = k_j/2 \text{ half of jam density}$$

$$v_m = 60 - 60/180 (90) = 30 \text{ mph}$$

$$q = v_m k$$

$$q = 30 (90) = 2700 \text{vph} > 2000 \text{ vph}$$

# JETS

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