

Homework Problem H18.A

Given: An automobile is attempting to tow a sled having a weight of W and whose contact with the ground has a coefficient of static friction of μ_s . The center of mass of the automobile and driver is located at point G on the automobile, with the total weight of the automobile and driver being W_C . The automobile has front wheel drive, with a coefficient of static friction of $2\mu_s$ between the front tires and the ground and with the rear wheels being free to roll.

Find: For this problem:

- Determine the maximum weight W of the sled that the automobile can initiate the towing of the sled without slipping between the tires and ground, and without the front wheels losing contact with the ground. Express your answer in terms of W_C .
- For the sled weight found in a) above, is the automobile on the verge of having the tires slip on the ground or of having the front wheels losing contact with the ground? Explain.

For this problem, use the following parameter value: $\mu_s = 0.50$.

