

**Läsåret 07/08****SG1108 Tillämpad fysik, mekanik, 7,5 hp****Projekt: Störtlopp**

By what means can a skier increase his/her overall speed for a down-hill ski course? The aim of increasing overall speed, or equivalently, decreasing the course time, can be accomplished by altering certain factors which are within the skier's control. For example, skiers constantly wax their skis with specially prepared waxes so as to decrease the friction between the skis and the snow as much as possible.

Your aim is to formulate a mathematical expression describing the motion of a skier on a down-hill ski run, and from this it will, hopefully, be able to detect factors which can be altered to increase the skier's speed.

The conditions which affect the skier's descent, and which may be taken into account, are:

1. The component of gravity acting down the slope;
2. Friction between the snow and the skis;
3. Air resistance.

There are many other relevant features which can be incorporated in your formulation of the skier's motion. You should consider these, and decide on their significance and if they can be omitted. For example, the skier is able to aid the effects of gravity by the use of his/her ski sticks, but, apart from increasing his/her stability, is the effect on his/her speed by pushing backwards very great?