
Mechanics of alpine skiing: carve turn without angulation

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The article deals with the problem of modelling the motion of the skier–skis system when the skier is making a carve turn without lateral slippage and naturally edging the skis with no angulation. We found out the conditions for making a carve turn without angulation, which impose constraints upon the steepness of the slope, the speed and movement direction of the skier. The basic dynamic problem represents the differential equation system. Step-by-step integration of this system solves the problem and allows us to measure the trajectory, speed and center-of-gravity position of the skier–skis system as well as the skier’s inclination and travel time along the trajectory. To illustrate this developed model we showed problem solving examples for two particular cases of motion. The results obtained can be of great help to trainers and teachers specializing in ski tourism and sport, as well as to the developers of ski equipment.

Keywords: *biomechanics of sport, slalom path, angulation, skier’s inclination, carve turn*

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