Automatic Adaptation of Tire Pressure According to Operating Conditions

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Abstract

The off-road vehicles have much higher rolling resistance due to tire sinkage. This paper presents a proposed system
for automatic adaptation for tire inflation/deflation, according to operating conditions. The tire inflation pressure is
manually changed by the driver to some prefixed pressure values. The proposed control system is based on calculating
the instantaneous wheel slip ratio. As the slip ratio increases, the tire pressure decreases automatically to increase the
contact area and to decrease the dynamic sinkage and vice versa. An algorithm for the control strategy is developed.
The proposed system provides a continuous monitoring of tire pressures inside the tire and then to inflate/deflate
according to terrain types. The results show that a low inflation pressure has a considerable effect on the net traction
ratio where it improves the performance by 20% and the buffed tire has a better traction than lugged tire on sand.

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