Energy Regeneration from Decelerating Vehicle

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***Abstract*—Up to now most car braking systems use hydraulic braking technology, which converts the excess of kinetic energy into heat, effectively resulting in an energy loss. Regenerative breaking technology supposedly deals with this problem by converting kinetic energy back into electrical energy that can then be reused for example during acceleration. Current hybrid vehicles are equipped with regenerative braking technology which makes them particularly interesting for situations with frequent deceleration, like city traffic. However, the technology used in these vehicles has its limitations and therefore does not stand on its own, but is assisted with conventional hydraulic brakes. This paper looks at removing this limitation and allowing a vehicle to fully rely on regenerative braking technology to deal with any braking situation ranging from simple slow down to full emergency braking. To enable this, multiple generators with different gear ratios are used. The additional benefit of this construction is that the generators can be used as electrical engines and ensure proper acceleration at any speed. The paper shows that the overall efficiency of the system is very close to the efficiency of the generators used while achieving braking performance similar to conventional braking mechanisms.**