# Differential system for the Rocker-Bogie suspension

### Need for a differential system -

* If you build a model rover and you attach the rockers to the body with an axle or two pivot pins, the body will tip forward or backward until it hits the ground.
* In the real rovers the two rockers connect to each other and to the body through a mechanism called a differential. The differential is what keeps the body level. Relative to the body, when one rocker goes up, the other rocker goes down. Relative to the ground, the body angle is halfway between the angles of the two rockers.

### The two basic types of systems -

#### 1)Differential Gearbox -

* The basic is a simple three-gear differential. Two gears connect to the two rockers and the third (middle) gear connects to the body. If one rocker is tilted up, the gears will turn and the other rocker will tilt down .
* The real Mars Exploration Rovers use more complicated gearboxes with more gears but they are functionally equivalent to this simple three-gear differential.
* The URC teams generally use a 4 gear differential as read in a couple of reports.

#### 2)Differential Bar -

* The middle of the bar is connected to the body with a pivot and the two ends are connected to the two rockers through some short links.
* Is used when the top part of the rover is free space .
* Works in almost a similar fashion when considering the movement of the rockers.

### Source -

* <http://alicesastroinfo.com/2012/07/mars-rover-rocker-bogie-differential/>

This link has animations which show the basic working of the systems.