# RBD IN DESIGN

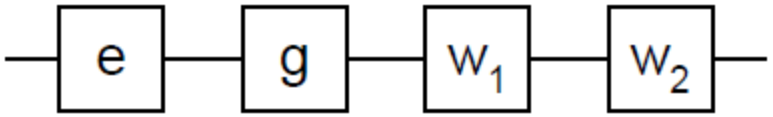
Reliability Block Diagram

# Reliability Block Diagram

- RBD is a diagrammatic representation for showing how component's reliability contributes to the overall success or failure of a complex system.
- A RBD is represented as a series of blocks connected in parallel or series arrangement. Each block represents a component of the system with a reliability factor.
- Any failure along a series arrangement causes the entire series path to fail. Correspondingly, in a Parallel arrangement, all of the parallel paths must fail for the parallel network to fail.
- An RBD may be drawn using switches in place of blocks, where a closed switch represents a working component and an open switch represents a failed component. If a path may be found through the network of switches from beginning to end, the system still works.

# Series RBD Example

Consider the power train of a motor car, comprising engine (e), gearbox and drive links (g), and two wheels (w1, w2). A failure of any element results in failure of the system.




**Example of a Series RBD**

# Formula for RBD

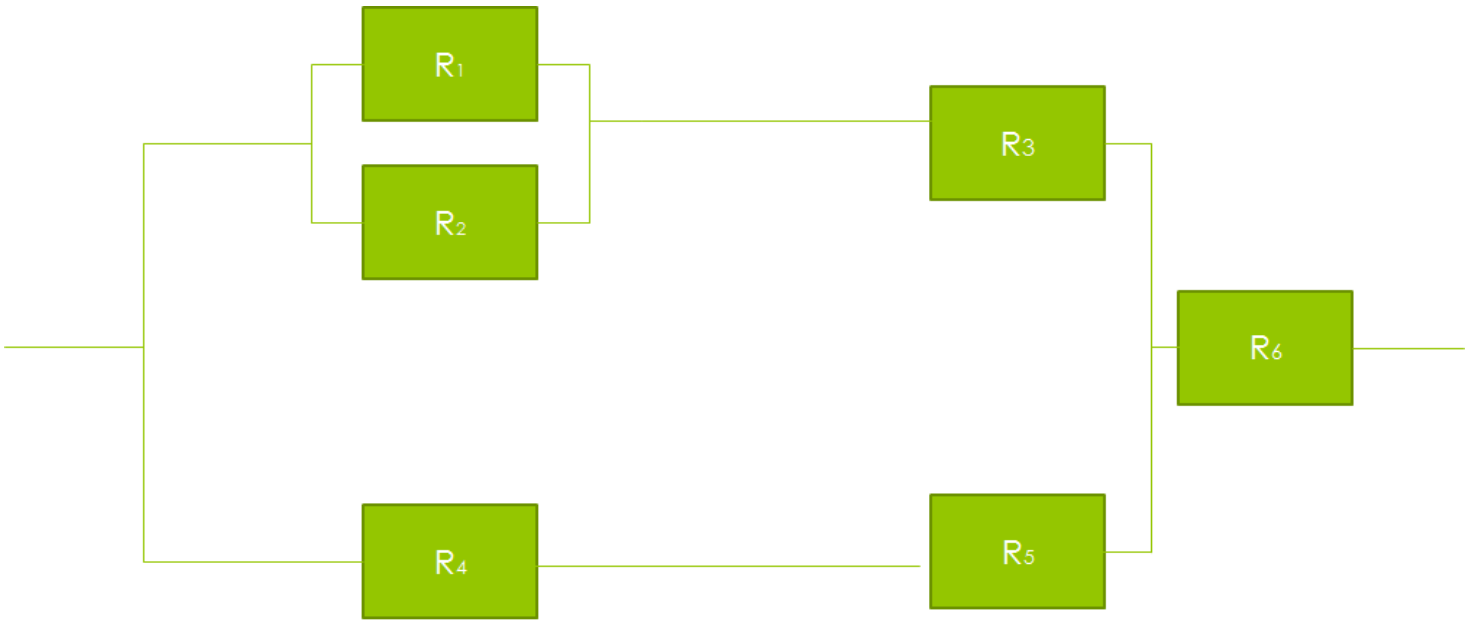
Formula for Series Configuration

$R_S = R_1 * R_2 \ldots R_n$

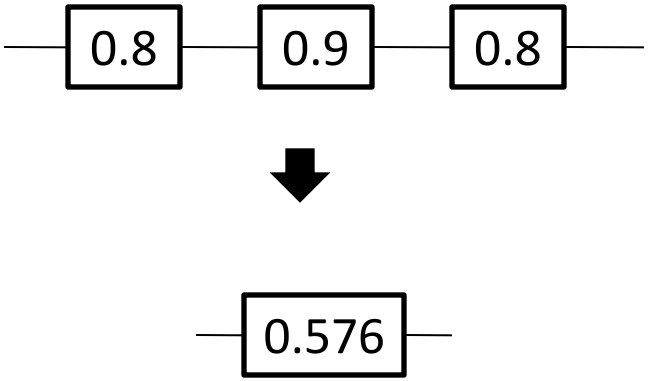
Formula for Parallel Configuration

$R_S = 1-(1-R_1)(1-R_2)\ldots(1-R_n)$

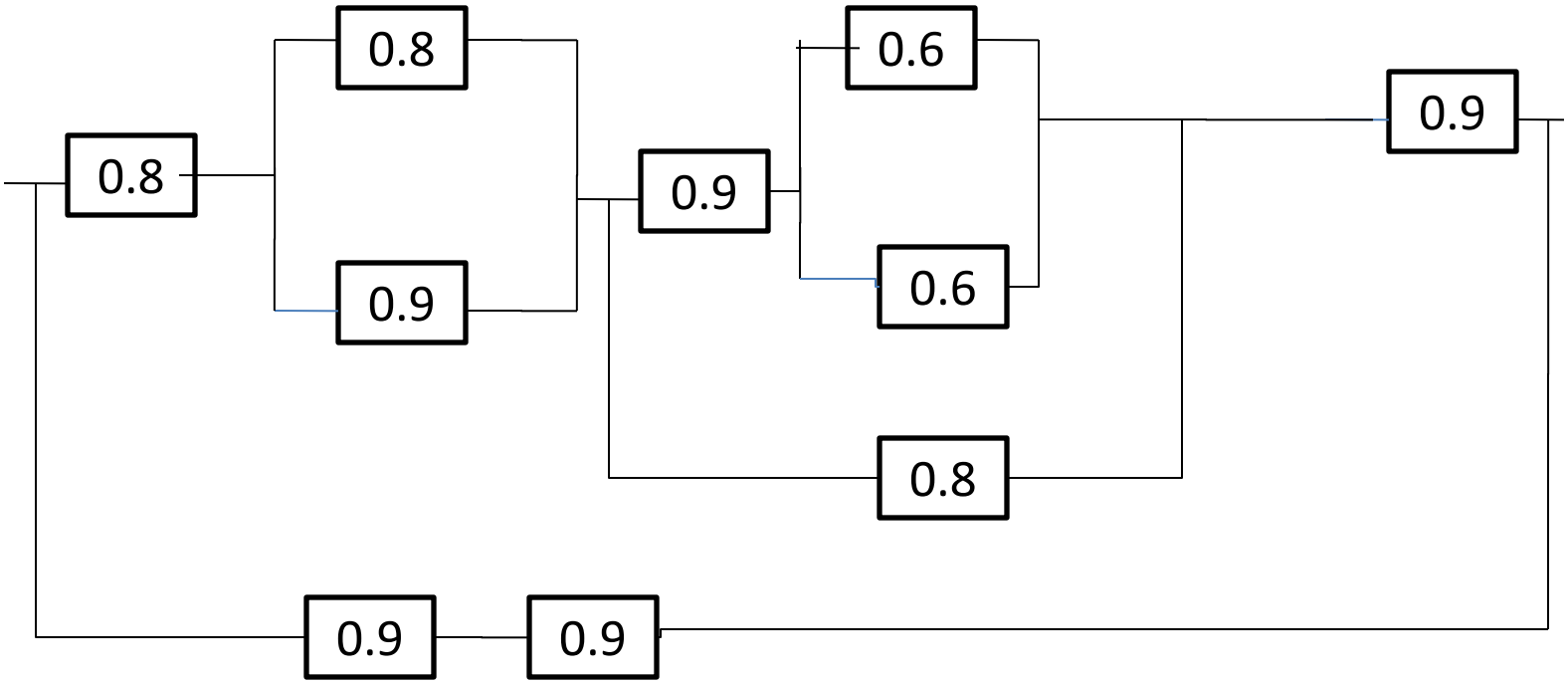
# Combination of Series and Parallel



# Example for Series



# Example for Series-Parallel



# Example for Series-Parallel (contd.)