



IIT ROORKEE



NPTEL ONLINE
CERTIFICATION COURSE

AUTOMATIC CONTROL SYSTEM

BLOCK DIAGRAMS

DR ANIL KUMAR

DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING



BLOCK DIAGRAM (BD)

- A control system may consist of a number of components
- To show the functions performed by each component, we commonly use block diagram
- A BD of a system is a pictorial representation of the functions performed by each component and of the flow of signals
- In a BD all system variables are linked to each other through functional blocks
- The functional block (or block) is a symbol for the mathematical operation on the input signal to the block that produces the output
- The TFs of the components are usually entered in the corresponding blocks, which are connected by arrows to indicate the direction of the flow of signals
- A BD of a control system explicitly shows a *unilateral property* as signals can pass only in the direction of the arrows

PROPERTIES OF BLOCK DIAGRAM

- It is easy to form BD for the entire physical system and it is possible to evaluate the contribution of each component to the overall performance of the system
- The functional operation of the system can be visualized more readily by examining the BD than by examining the physical system itself
- A BD contains info concerning dynamic behaviour but it does not include any information on the physical construction of the system
- Conversely many dissimilar and unrelated systems can be represented by the same BD
- A number of different BD can be drawn for a system, depending on the point of view of the analysis

REFERENCE BOOKS

- Norman S. Nise, Control Systems Engineering, Wiley, 2013
- Katsuhiko Ogata, Modern Control Engineering, Prentice Hall, 2010.

