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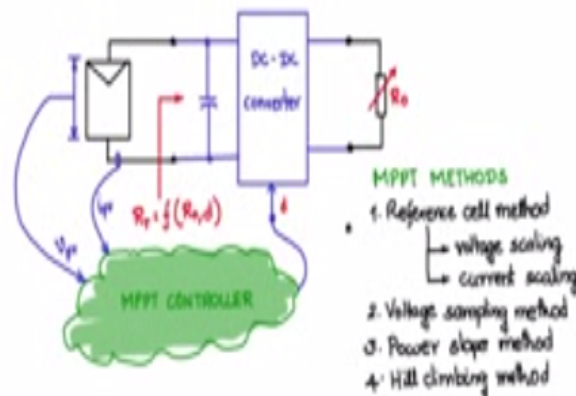
Design of Photovoltaic Systems

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IMPEDANCE CONTROL METHODS FOR MPPT



Let us see how we can perform impedance control on converters interface to photovoltaic panels, so that we can achieve maximum power point tracking. So let us connect a PV panel to a DC-DC converter and the out of the DC-DC converter is connected to a load. DC-DC converter has a controlled input  $D$ . The control input  $D$  and the load  $R_0$  are varying load  $R_0$  the variation of load  $R_0$  is not under your control.

However, the variation of  $D$  is under your control and that is what we would like to use as the control input. And we have established that  $R_T$  the terminal resistance as seen from the photovoltaic panels side is a function of  $R_0$  and  $D$ . We should now establish how we would go about generating the appropriate signal for the duty cycle.

So we need to design this block, the controller block for performing maximum power point tracking for that you need two inputs, one is the current, the photovoltaic module current that is

flowing through the photovoltaic panel, the other is voltage across the array panel or the array. So that also needs to be given as signal inputs to this block. And the output of the block will provide the appropriate signal for the duty cycle.

So this block is what we will be focusing on, we will be discussing and that is the MPPT controller block. This will be the object of our discussion now, and we will look at what are the control mechanisms and control methods that we can use to achieve maximum power point tracking. Literature has many methods to perform MPPT we shall look at few typical methods that are commonly employed for doing maximum power point tracking.

Some of the MPPT methods that we will discuss, one is called the reference cell method, there are two types the voltage scaling, and the other one of course is the current scaling type. The second is the voltage sampling method, the third is called the power slope method, and the fourth one is a hill climbing method.

So we shall look at these methods, these are very typical, very common many of the converters use one of these are modification of these methods. And therefore, it will try to cover the whole range of maximum power point tracking algorithms.