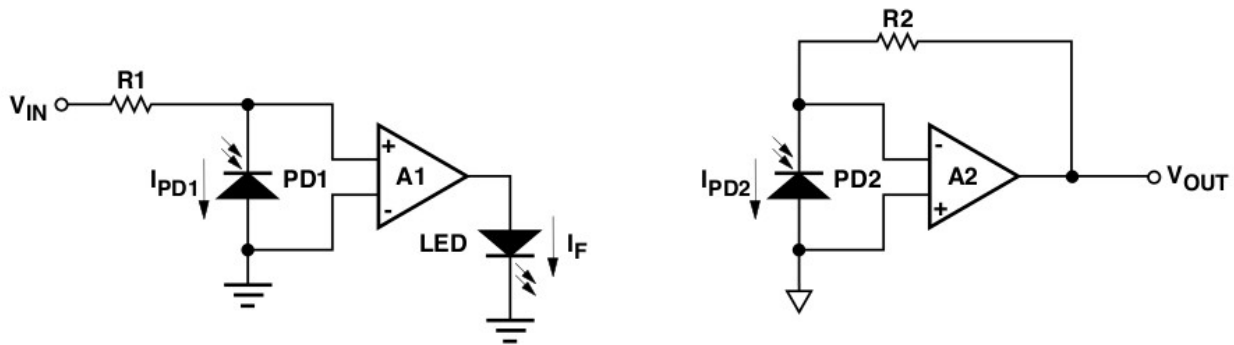


Water flow detection using a differential IR current mirror (Thinking out loud)

The basic theory behind this uses two receiving IR LEDs and one transmitter IR LED. The configuration forms an optical current mirror by allowing one of the receiver IR LED's to govern or regulate the transmitter LED. Ideally, both IR receivers in a "resting" state receive the same amount of light from the transmitting IR LED. This 'balance' forms the current mirror. In the circuit below, IPD1 is the current feedback IR receiving LED that in turn regulates the brightness of the transmitter LED. IPD2 follows exactly what IPD1 does. Because of how the two circuits are configured and optically linked, VOUT will follow or track whatever VIN is doing.



A) BASIC TOPOLOGY

Now, take this a step further and place the optical medium in water where IPD1 is used for a reference and IPD2 is in the flow of an Oxygenated / Aerated position in the water pipe. (See image below). If VIN is a reference voltage, then the Flow should be proportional to something like

$$\text{FLOW} = V_{IN} / (V_{IN} + V_{OUT})$$

