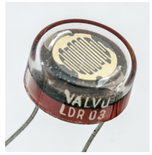
# Structured Electronic Design
# Principle of Amplification
# LDR demo

# From  to LDR light bulb amplifier to electronic amplifier

Can we create a circuit with
an available power gain > 1
using an LDR and a light bulb?



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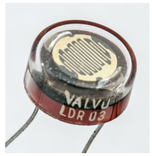
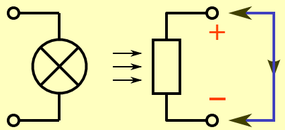
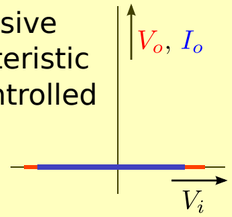



LDR = passive
V-I characteristic
can be controlled



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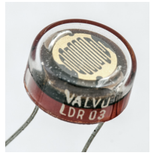


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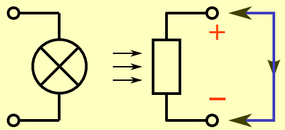


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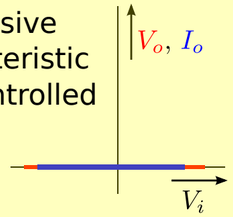

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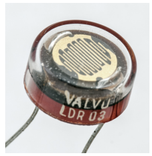


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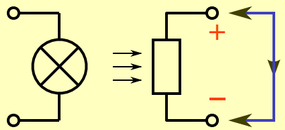


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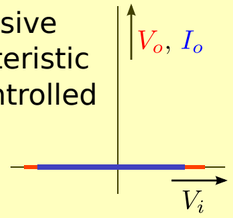


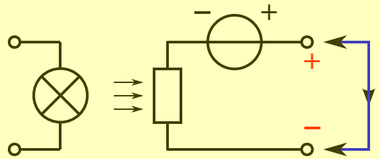


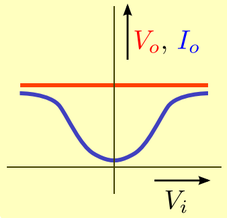


Current transfer
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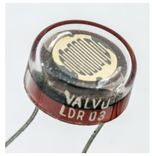


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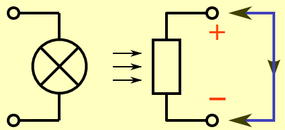


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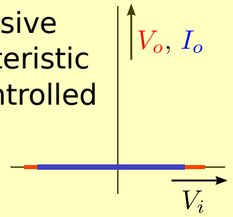


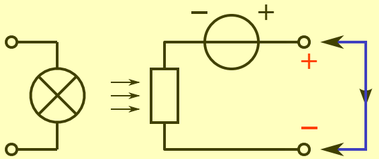


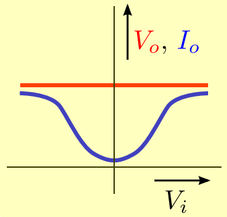


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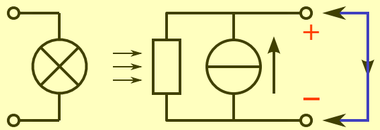


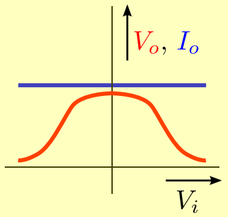


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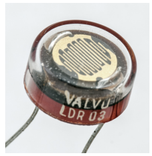


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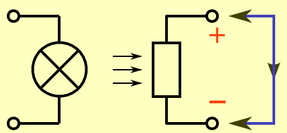

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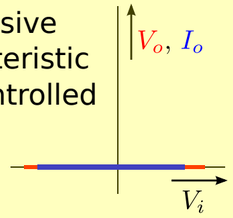


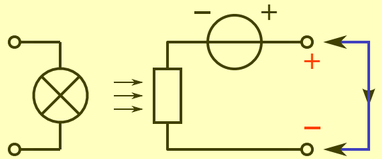

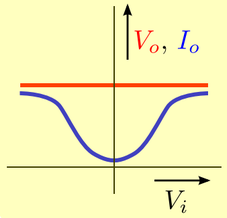


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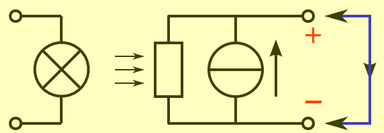

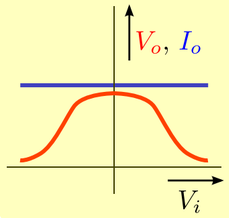


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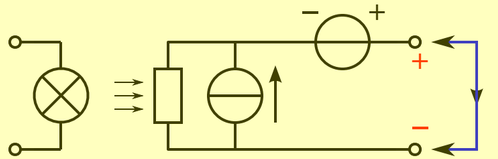

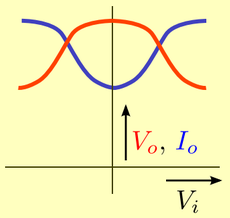


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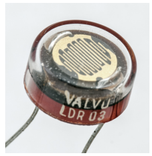


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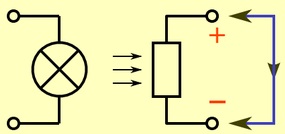

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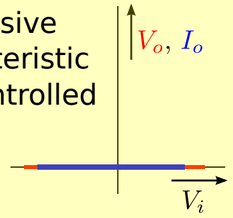


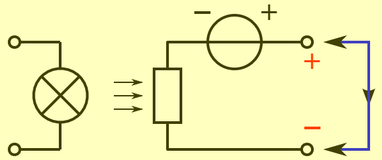

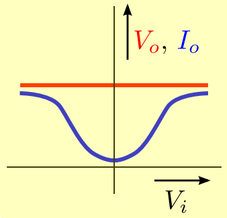


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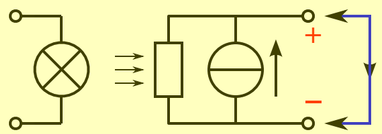

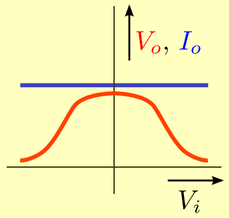


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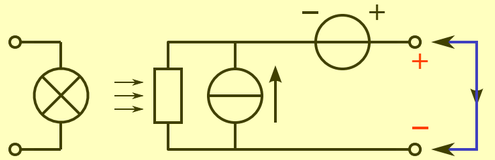

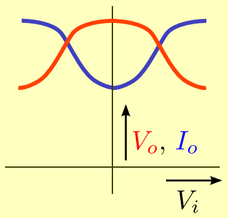


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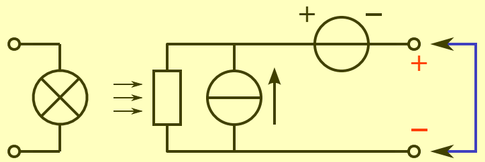

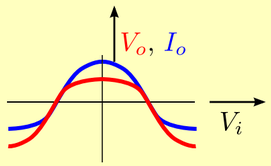


 

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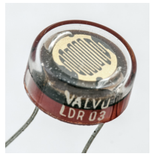


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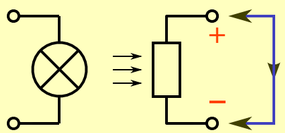

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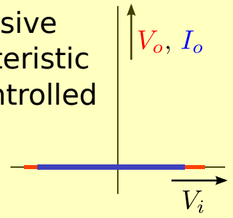


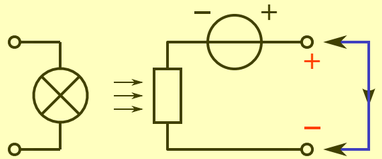

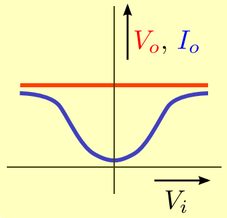


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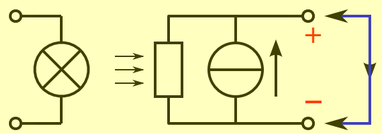

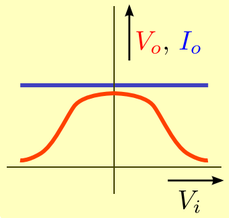


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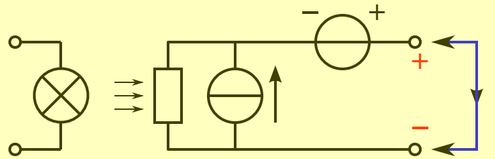

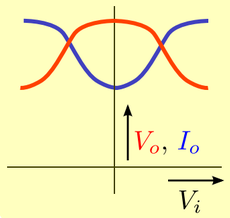


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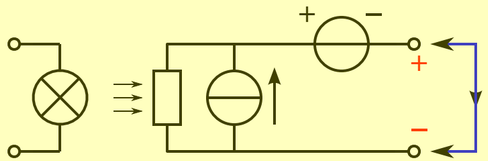
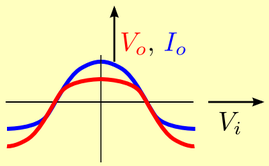
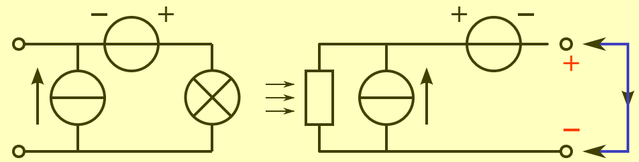
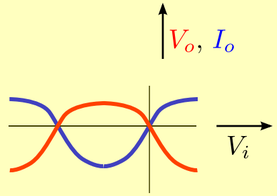





Input port operating point is shifted such that positive and negative input V & I are accepted






Input port operating point is shifted such that curves pass through the origin:

Input bias quantities depend on output bias quantities and device characteristics.

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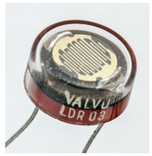


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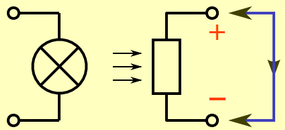

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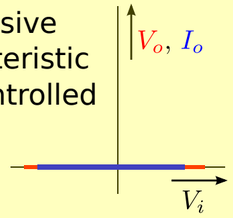
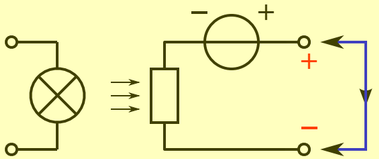
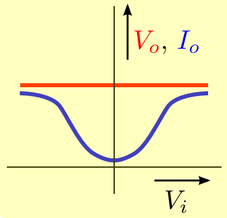
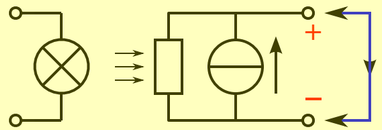
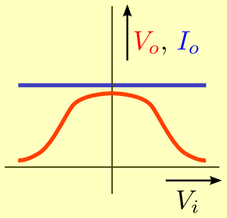


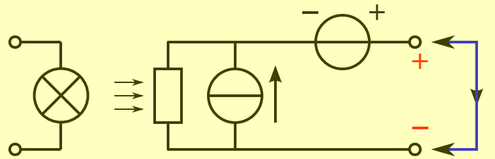


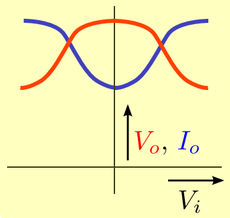

Current transfer
from power source
to output
can be controlled





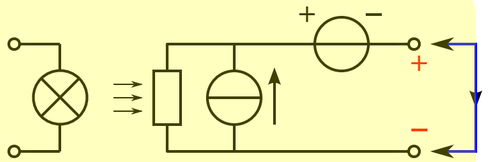

Voltage transfer
from power source
to output
can be controlled

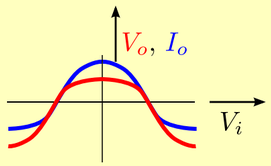


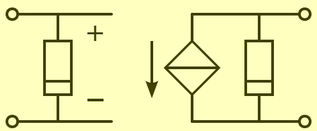



Voltage and current
transfer from power
sources to output
can be controlled

Output port operating point is shifted such that positive and negative output V & I are possible

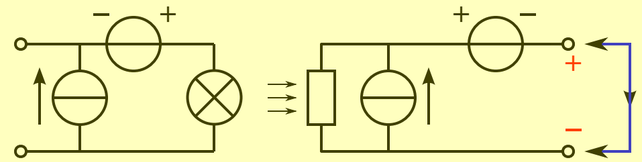


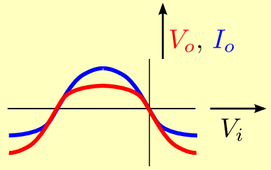


The biased passive device modeled as an active device

Input port operating point is shifted such that positive and negative input V & I are accepted





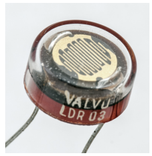

Input port operating point is shifted such that curves pass through the origin:

Input bias quantities depend on output bias quantities and device characteristics.

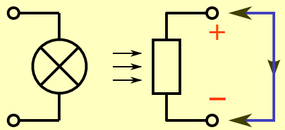
 

# From  to LDR light bulb amplifier to electronic amplifier

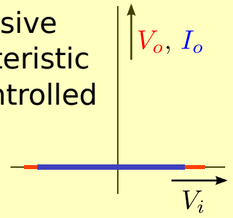
Can we create a circuit with an available power gain > 1 using an LDR and a light bulb?

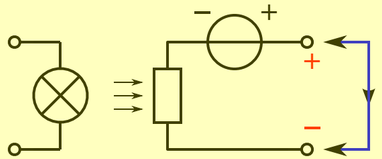


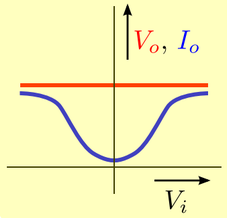

The LDR and the light bulb are passive devices and cannot deliver power, we need a power source!

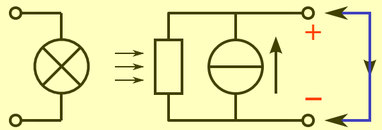
LDR = passive
V-I characteristic
can be controlled

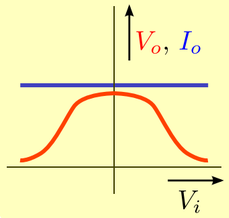


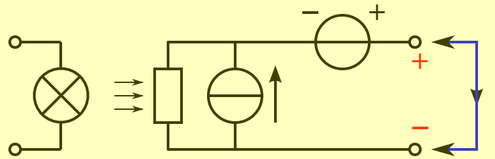


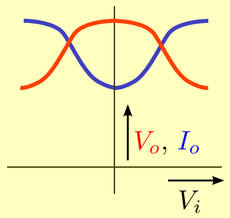

Current transfer
from power source
to output
can be controlled





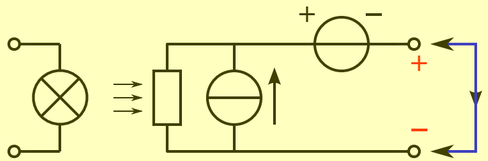

Voltage transfer
from power source
to output
can be controlled

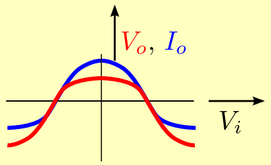




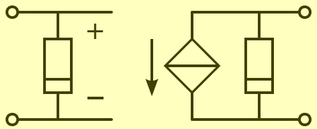

Voltage and current
transfer from power
sources to output
can be controlled

Output port operating point is shifted such that positive and negative output V & I are possible



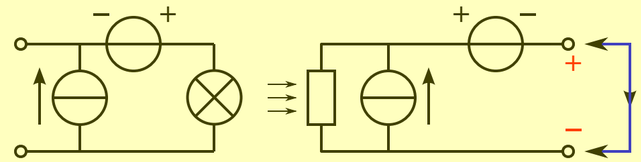


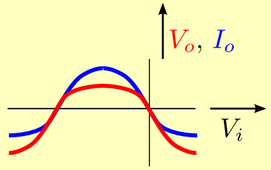

**Definition available power gain: Chapter 2**



The biased passive device modeled as an active device

Input port operating point is shifted such that positive and negative input V & I are accepted



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