

Wykład 8

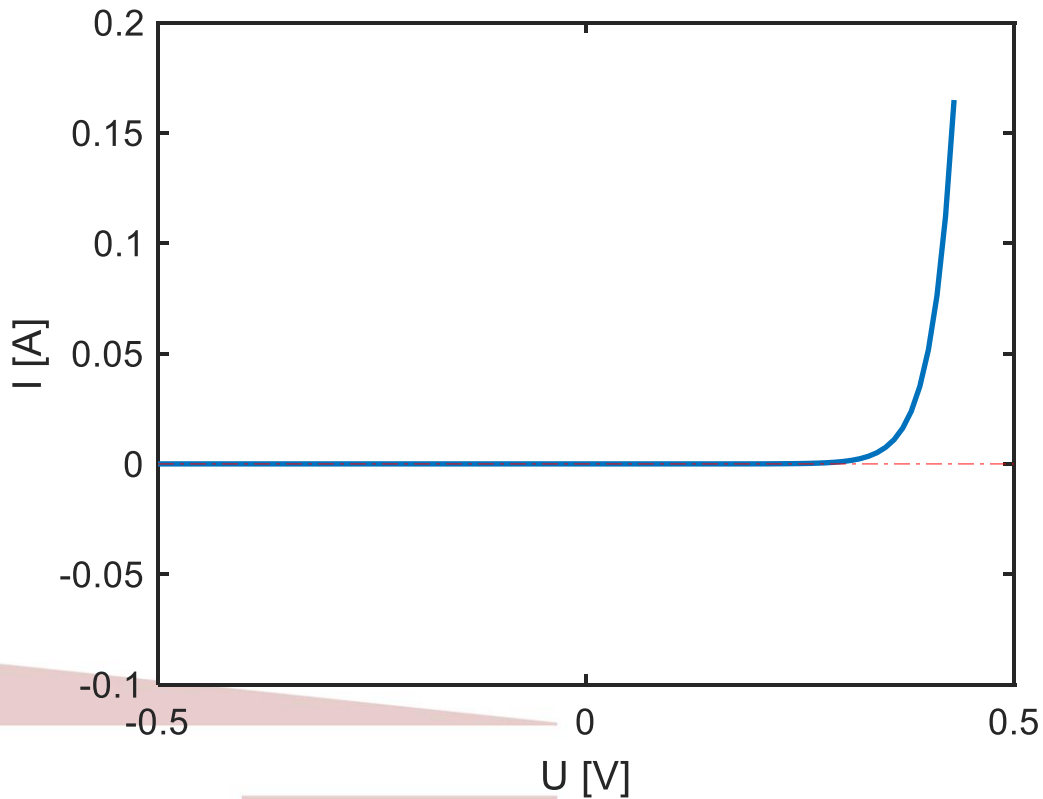
5.06.2024 r.

Model dwudiodowy ogniwa słonecznego

Katarzyna Gwóźdź



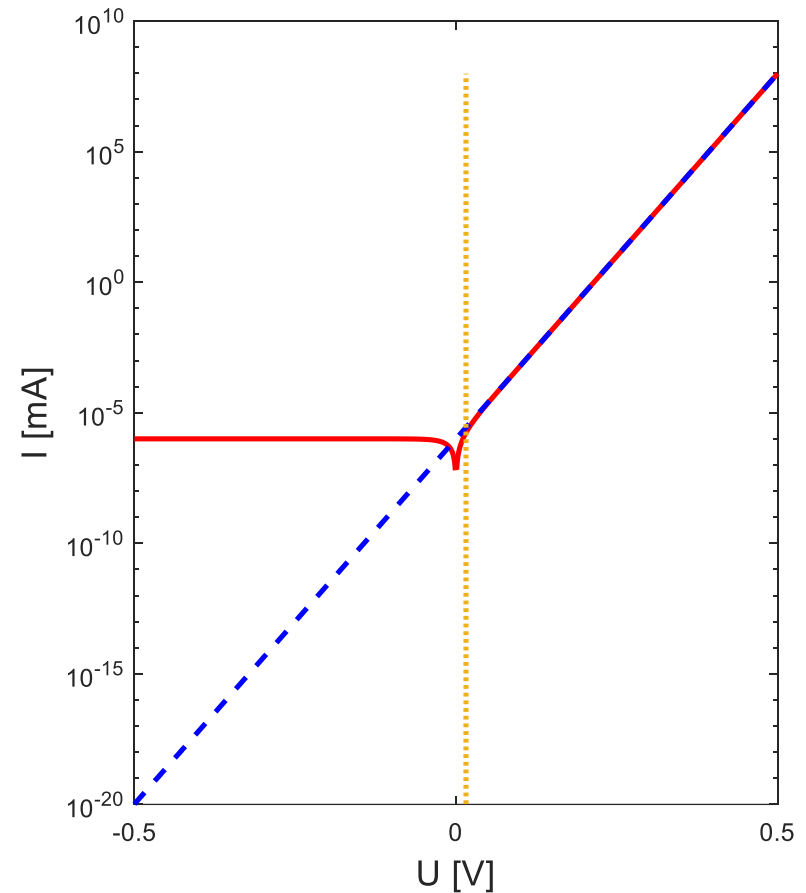
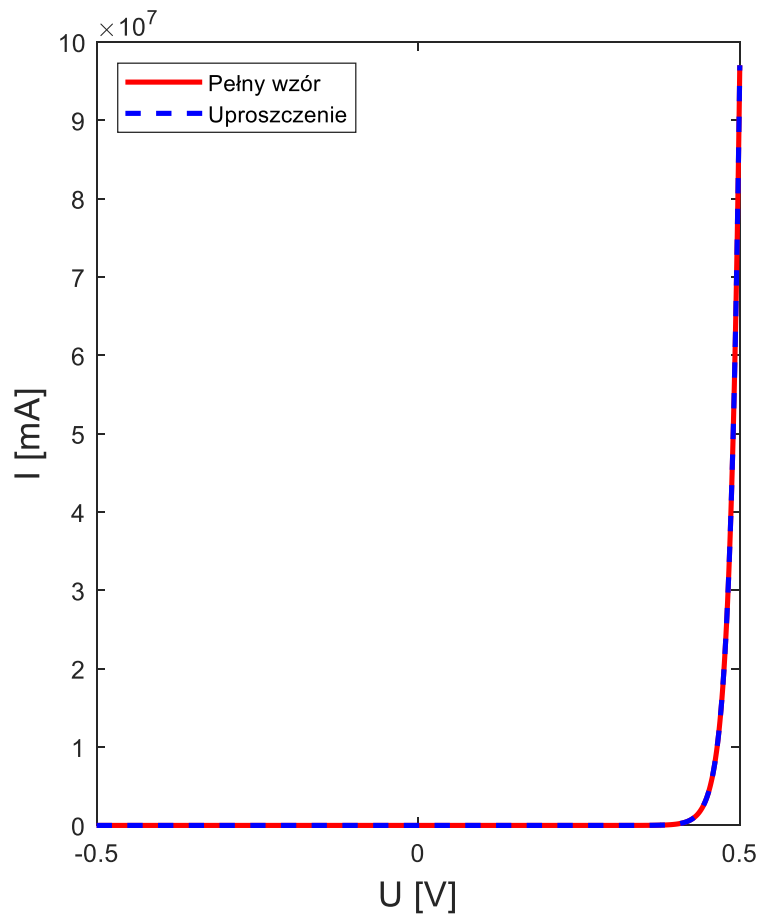
Charakterystyka I-V



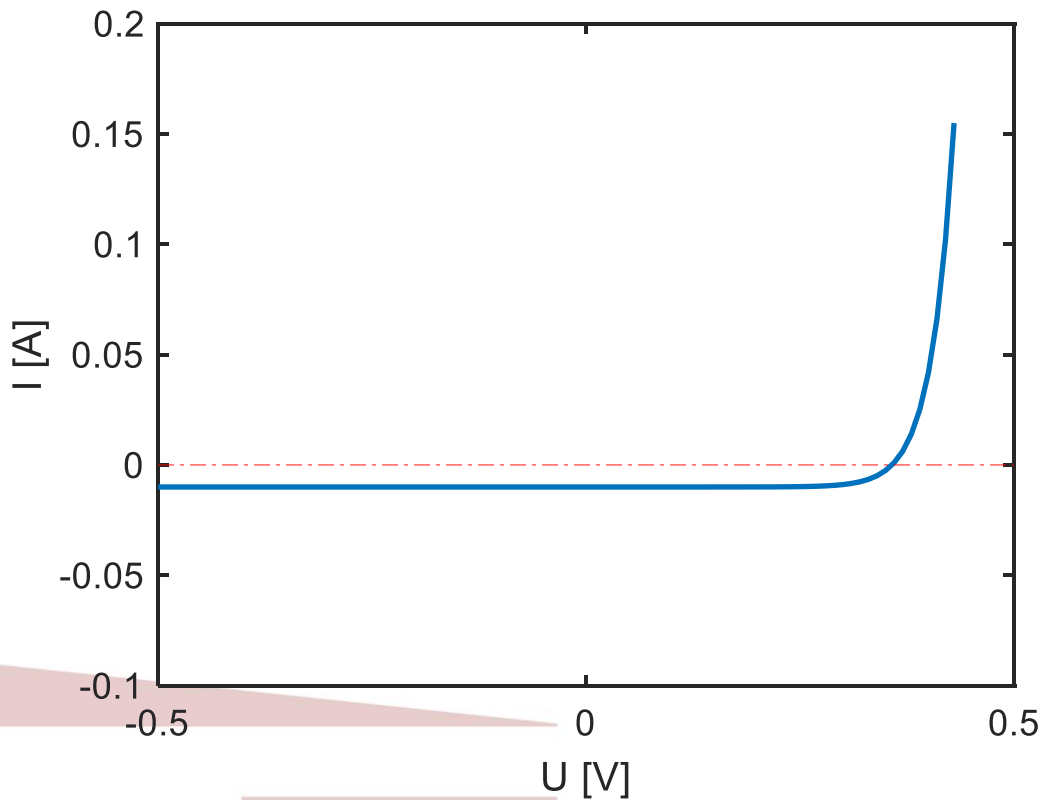
$$I = I_0 \left[\exp\left(\frac{qU}{nkT}\right) - 1 \right]$$



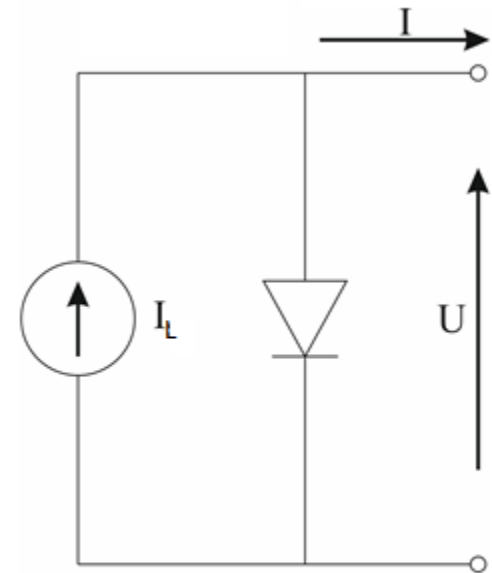
Charakterystyka I-V



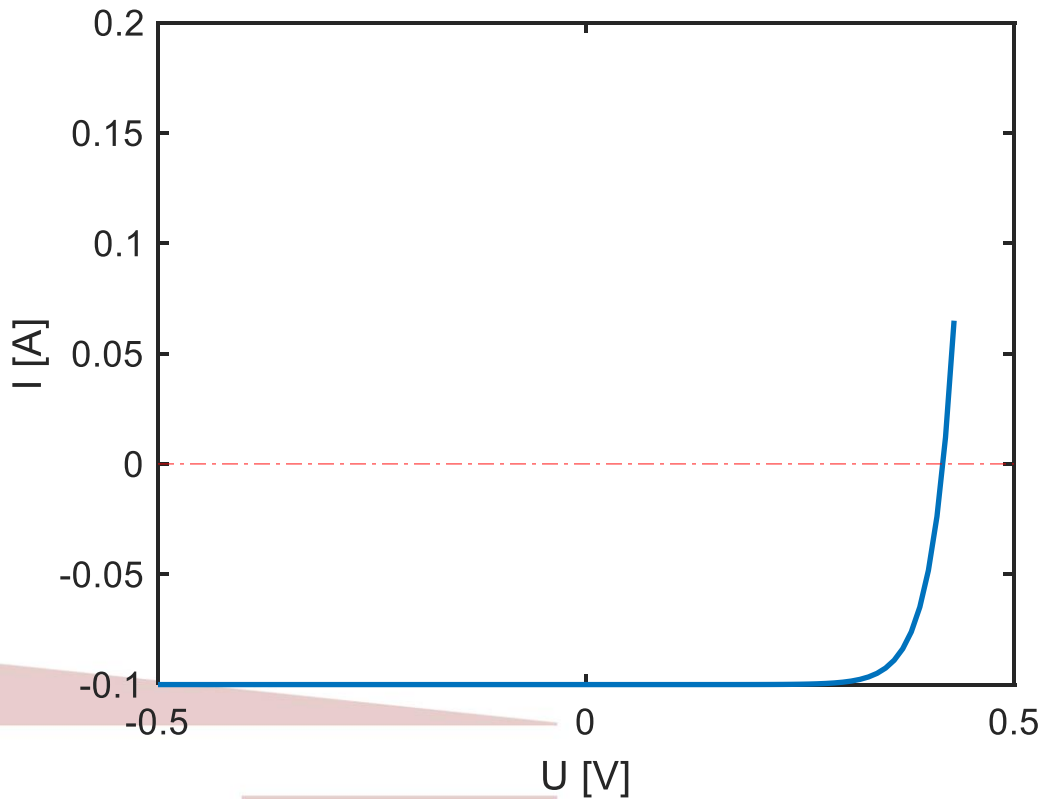
Charakterystyka I-V



$$I = I_0 \left[\exp\left(\frac{qU}{nkT}\right) \right] - I_L$$



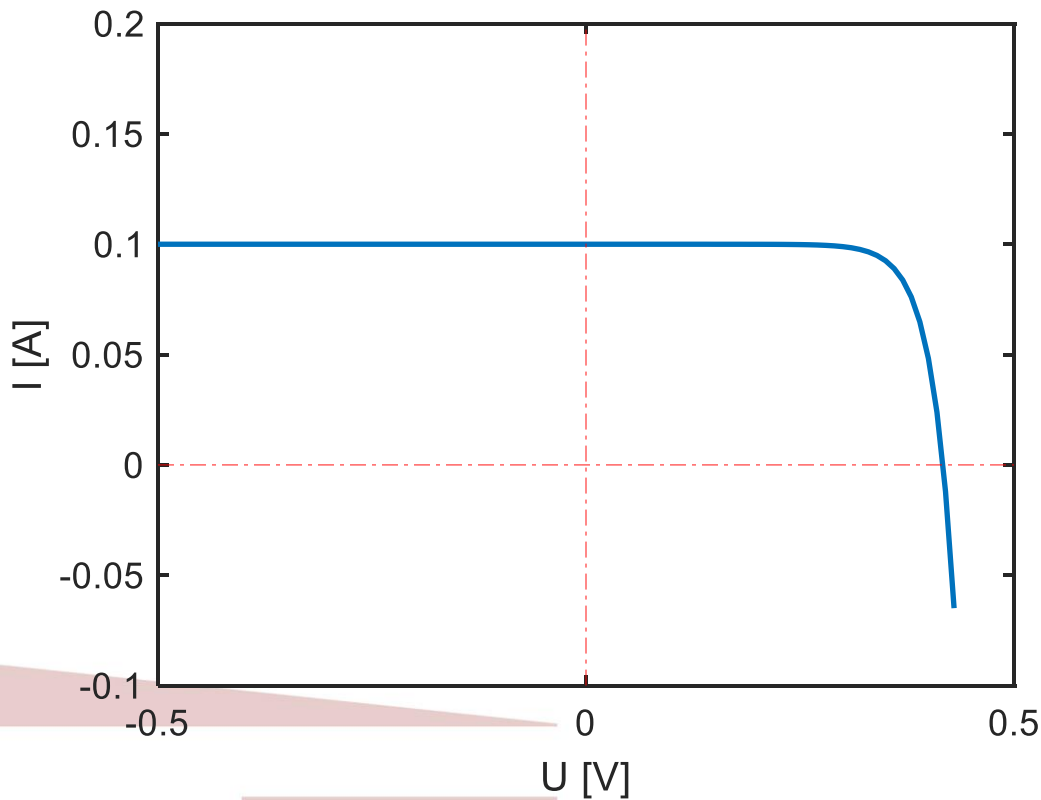
Charakterystyka I-V



$$I = I_0 \left[\exp\left(\frac{qU}{nkT}\right) \right] - I_L$$



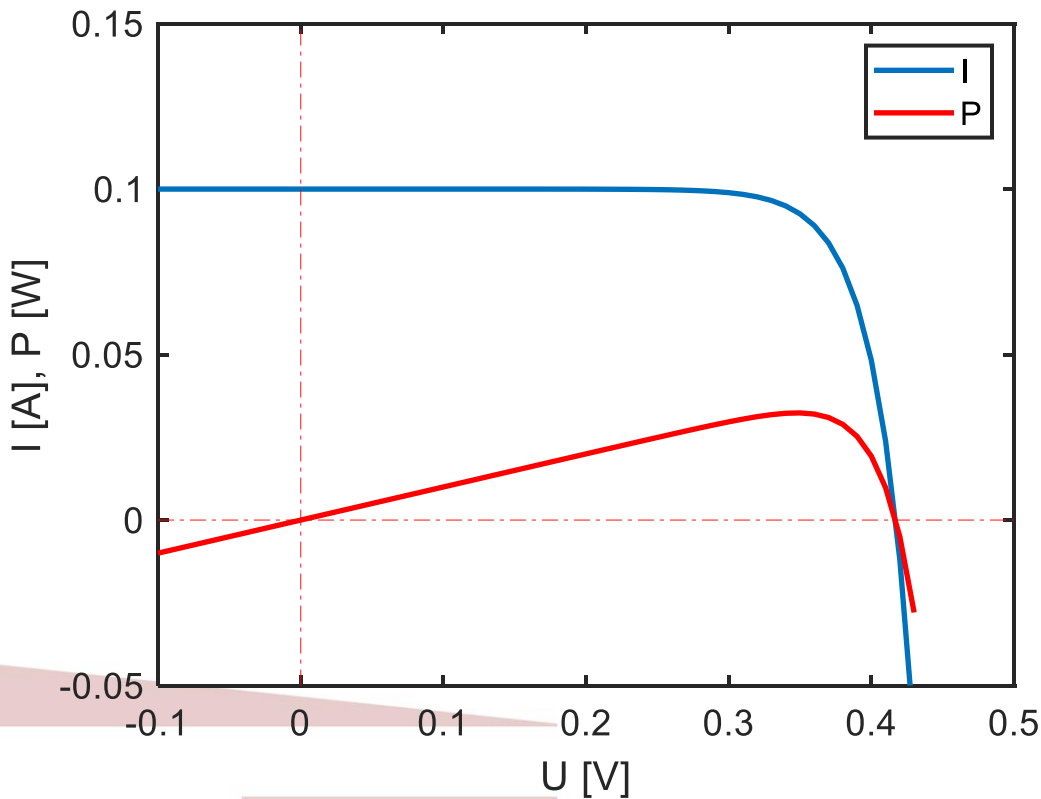
Charakterystyka I-V



$$I = I_L - I_0 \left[\exp\left(\frac{qU}{nkT}\right) \right]$$



Charakterystyka I-V

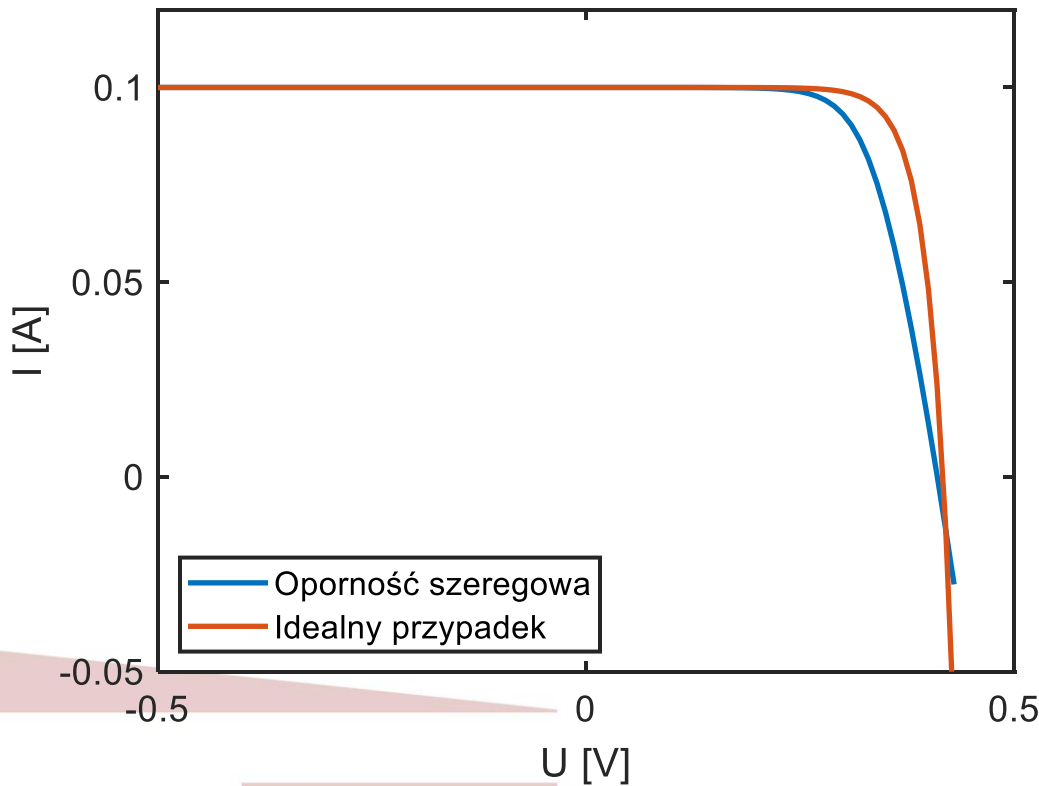


$$FF = \frac{U_{max} * I_{max}}{V_{oc} * I_{sc}}$$

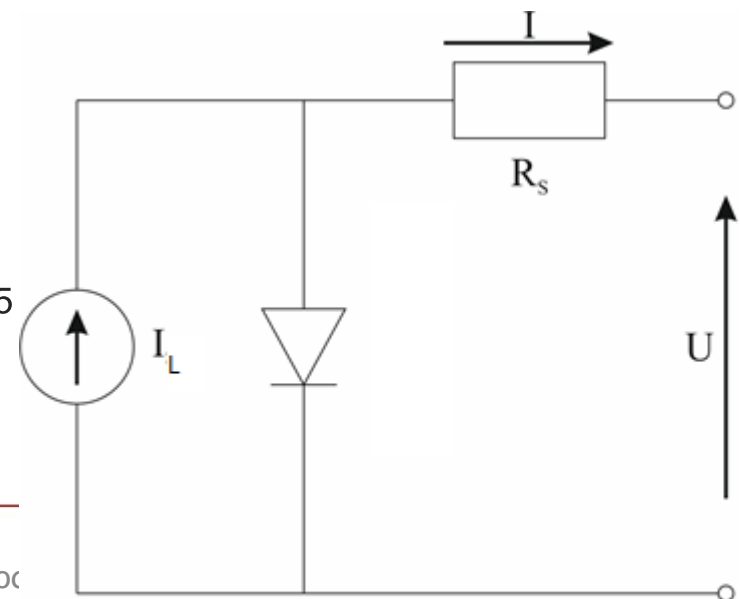
$$\eta = \frac{P_{max}}{P_{in}} = \frac{FF * V_{oc} * I_{sc}}{P_{in}}$$



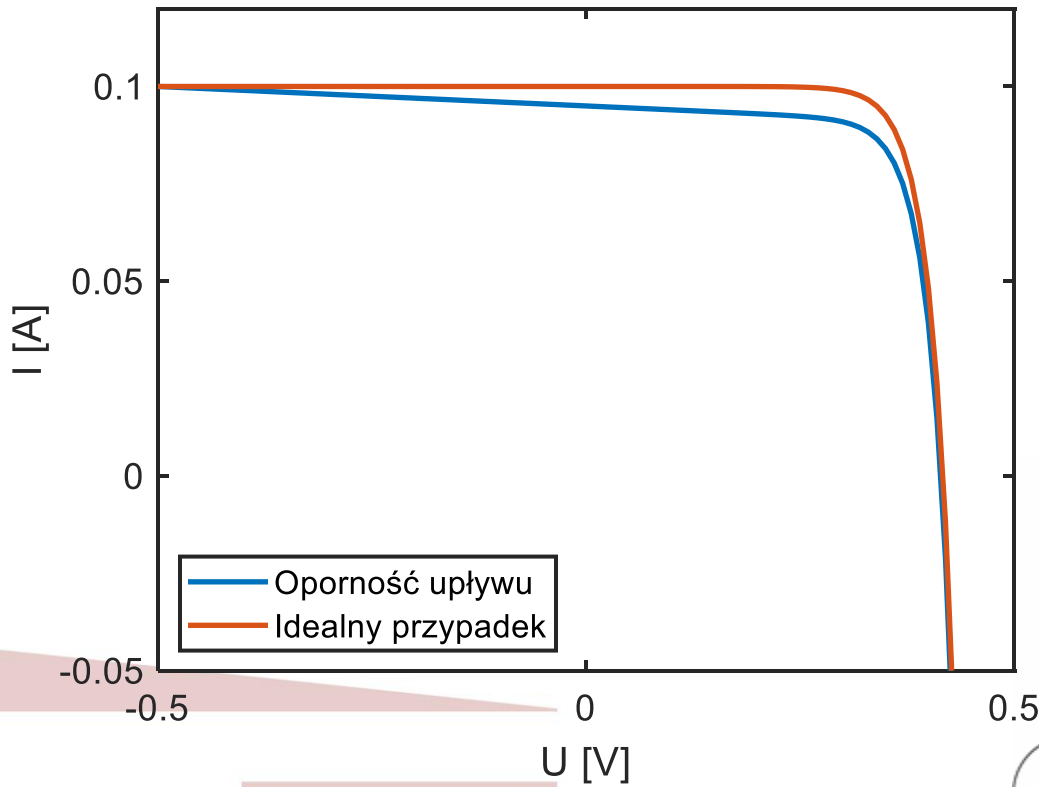
Oporność szeregowa



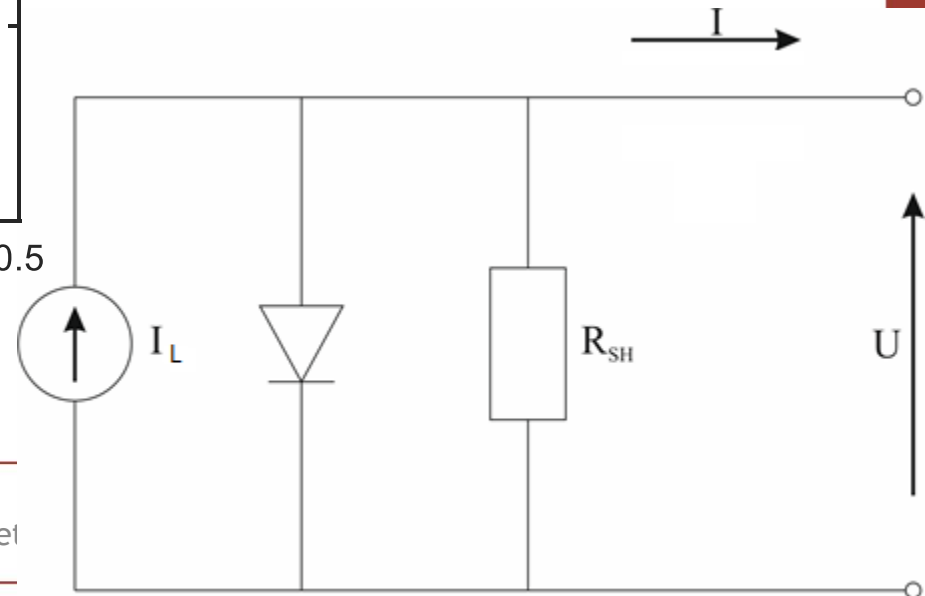
$$I = I_L - I_0 \left[\exp \left(\frac{q(U + IR_S)}{nkT} \right) \right]$$



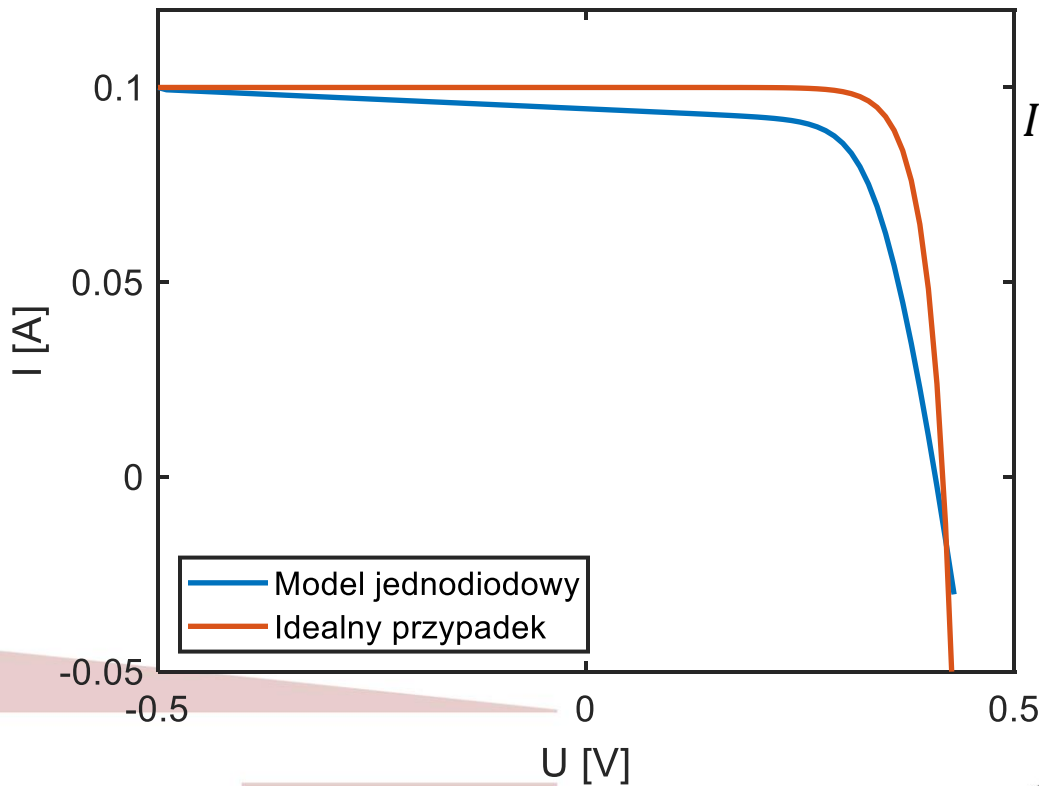
Oporność upływu



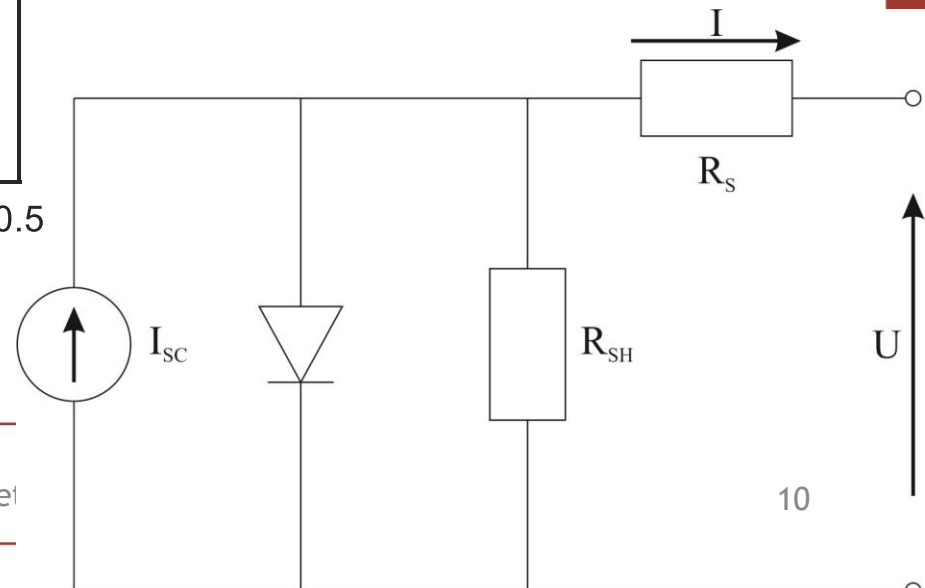
$$I = I_L - I_0 \left[\exp\left(\frac{qU}{nkT}\right) \right] - \frac{U}{R_{sh}}$$



Model jednodiodowy

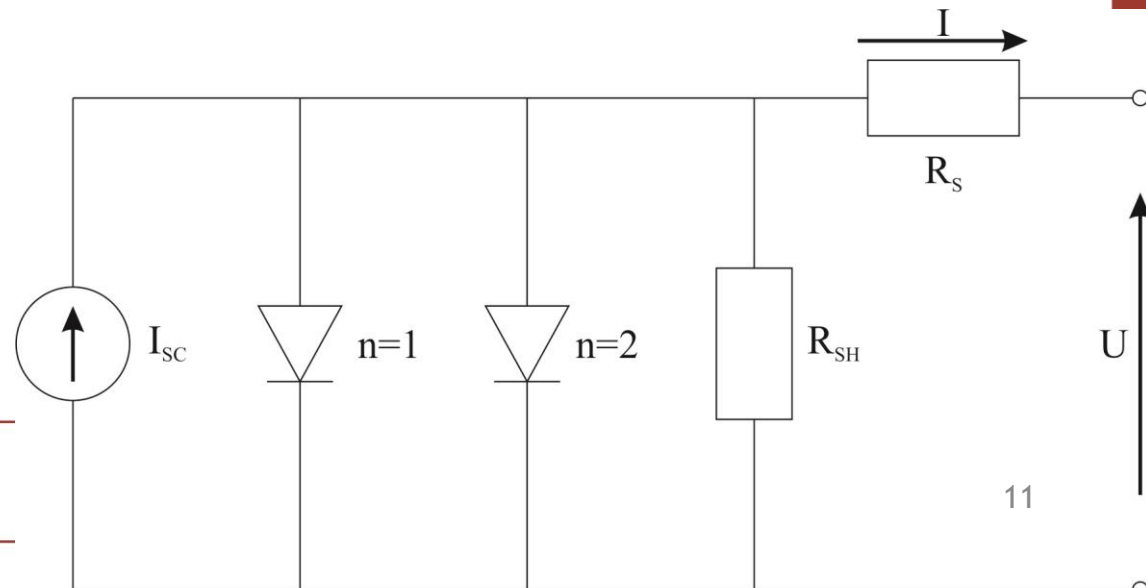


$$I = I_L - I_0 \left[\exp \left(\frac{q(U + IR_s)}{kT} \right) \right] - \frac{U + IR_s}{R_{sh}}$$

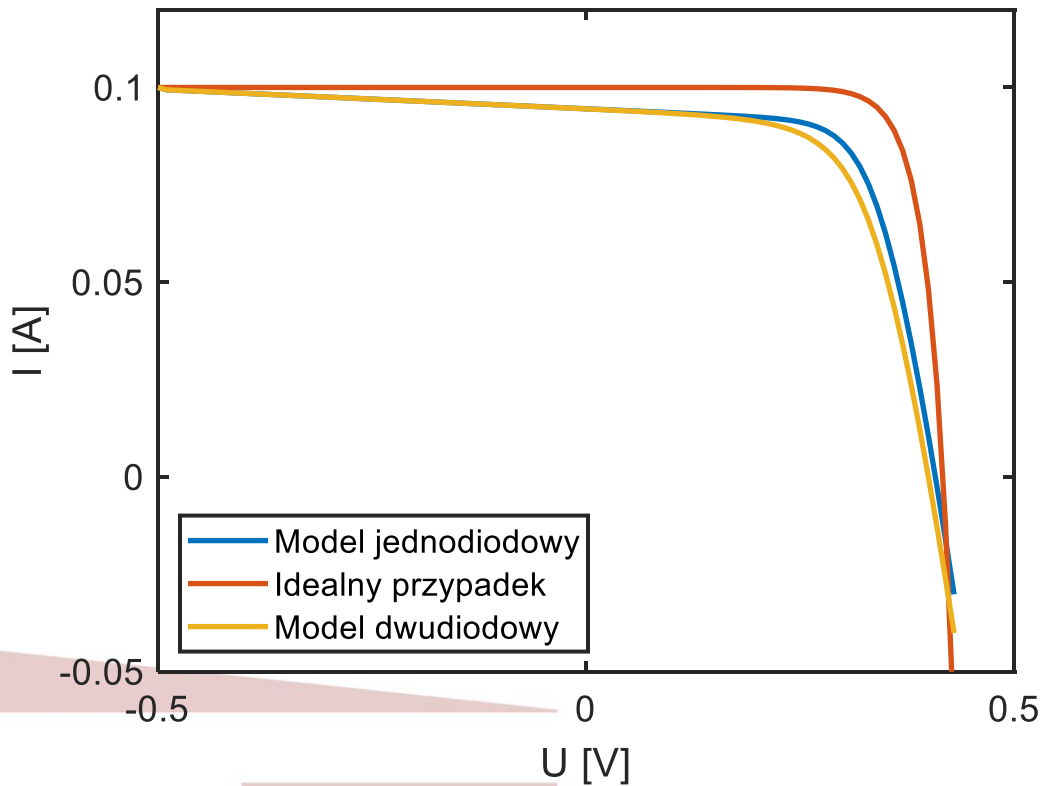


Model dwudiodowy

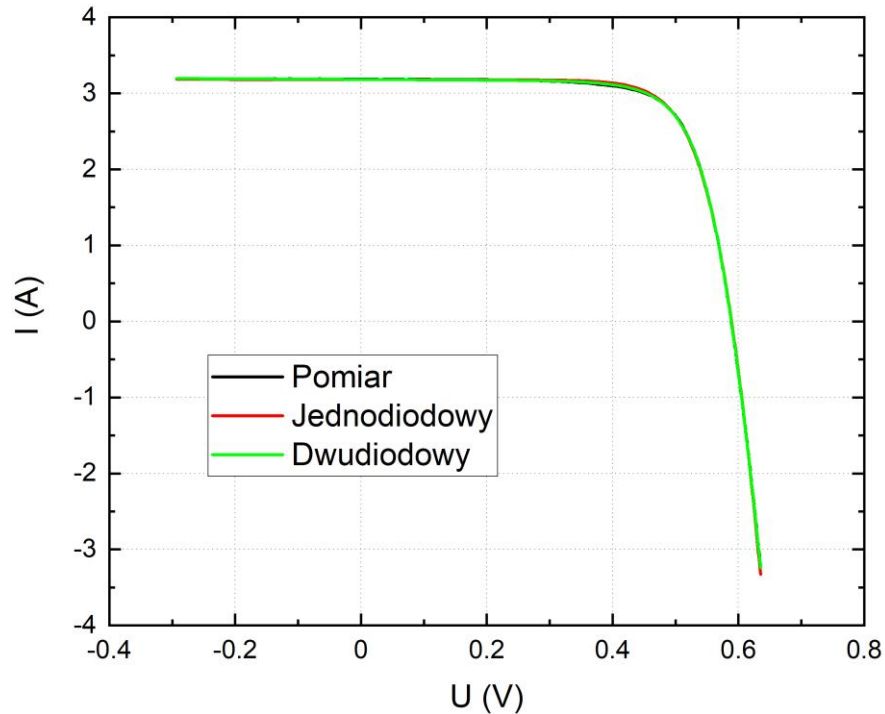
$$I = I_L - I_{01} \left[\exp \left(\frac{q(U + IR_s)}{kT} \right) \right] - I_{02} \left[\exp \left(\frac{q(U + IR_s)}{2kT} \right) \right] - \frac{U + IR_s}{R_{sh}}$$



Model dwudiodowy



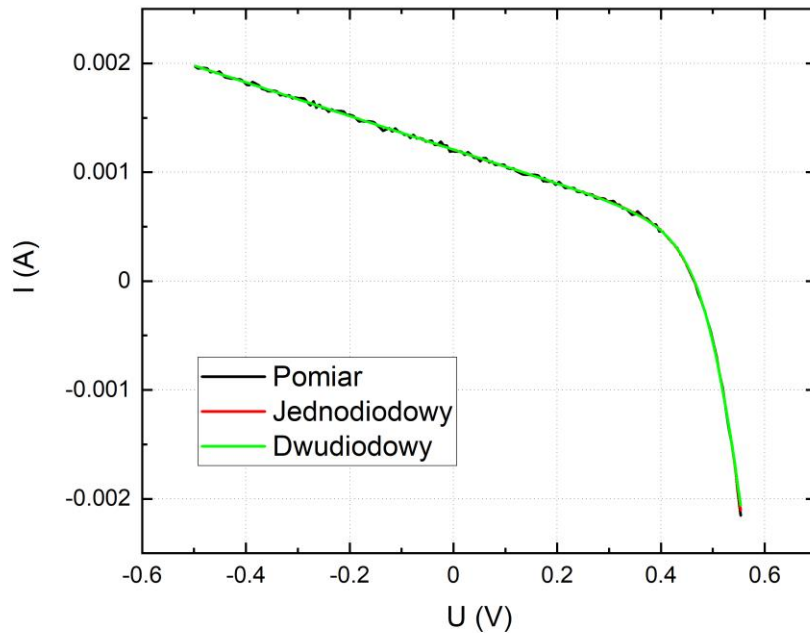
Eksperyment



Parametr	SDM	DDM
I_{ph} (mA)	3181.27	3183.85
R_s (mOhm)	5.41202	7.56196
R_{sh} (kOhm)	71.4466	25.6086
I_{01} (A)	$9.31529e-07$	$2.10883e-10$
I_{02} (A)		$1.30949e-05$



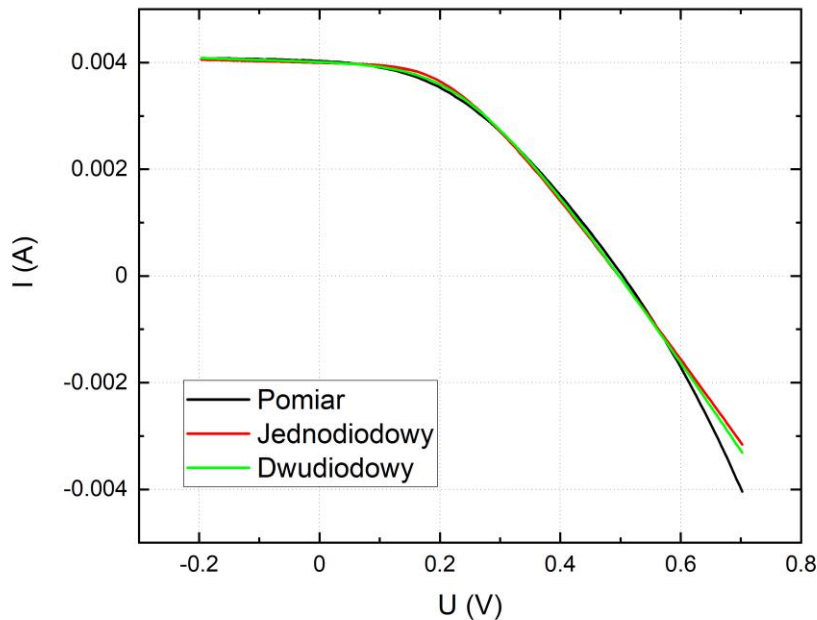
Eksperyment



Parametr	SDM	DDM
I_{ph} (mA)	1.22436	1.23803
R_s (Ohm)	9.07792	15.7478
R_{sh} (Ohm)	637.392	631.917
I_{01} (A)	1.18751e-08	2.2005e-12
I_{02} (A)		4.06468e-08



Eksperyment



Parametr	SDM	DDM
I_{ph} (mA)	4.06909	4.09351
R_s (kOhm)	58.9336	55.2913
R_{sh} (kOhm)	3.42349	3.09723
I_{01} (A)	$6.69527e-10$	$6.32609e-12$
I_{02} (A)		$1.47355e-07$

