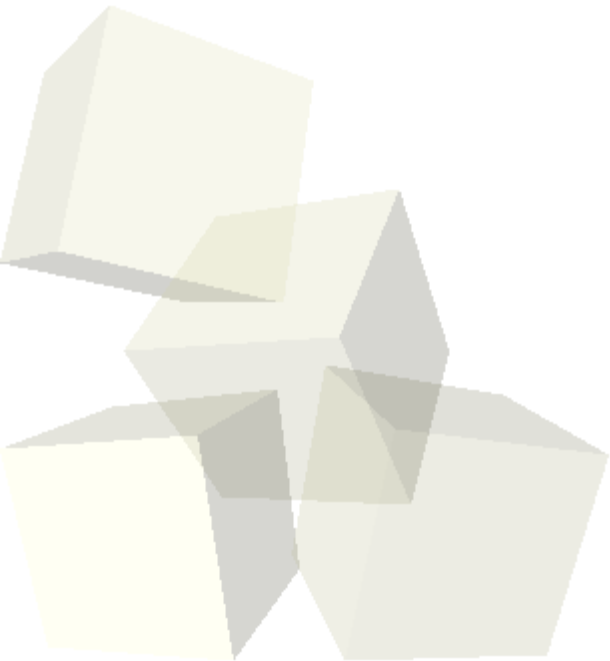
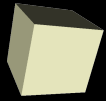


# Pomiary testowe wzmacniacza ładunkowego - wzmocnienia



*Dominik Przyborowski*





# Co do tej pory wykonałem:

## ■ Pomiar wzmacnień dla:

- 4 kanały
- 2 typy sprzężeń – MOS/ $R_f$
- 5 wartości pojemności detektora – od 0 do 100 [pF]

## ■ Wyznaczone zależności:

- Napięcie wyjściowe w funkcji iniekowanego ładunku, z pojemnością detektora jako parametrem:

$$V_{out} = f(Q_{in}) \Big|_{C_{det} = Const}$$

- Wzmocnienie ładunkowe w funkcji prądu przedwzmacniacza oraz shapera



# Zestawienie wyników dla board'u 2

R\_fed  
tryb kalibracyjny

| Wzmocnienie ładunkowe Kq [mV / fC] |        |         |         |         |         |         |
|------------------------------------|--------|---------|---------|---------|---------|---------|
| Ch                                 | 0 [pF] | 22 [pF] | 44 [pF] | 66 [pF] | 88 [pF] | 100[pF] |
| 1.                                 | 13.46  | 14.52   | 15.14   | 15.77   | 16.36   | 16.68   |
| 2.                                 | 12.84  | 14.07   | 14.81   | 15.51   | 16.09   | 16.48   |
| 3.                                 | 12.92  | 14.18   | 14.99   | 15.72   | 16.42   | 16.73   |
| 4.                                 | 12.63  | 13.90   | 14.67   | 15.42   | 16.09   | 16.38   |

# Zestawienie wyników dla board'u 2

R\_fed  
tryb fizyczny

| Wzmocnienie ładunkowe Kq [mV / pC] |        |         |         |         |         |         |
|------------------------------------|--------|---------|---------|---------|---------|---------|
| Ch                                 | 0 [pF] | 22 [pF] | 44 [pF] | 66 [pF] | 88 [pF] | 100[pF] |
| 1.                                 | 108.22 | 108.39  | 108.18  | 108.07  | 107.58  | 107.78  |
| 2.                                 | 108.04 | 107.84  | 107.85  | 108.45  | 107.67  | 107.58  |
| 3.                                 | 106.31 | 104.42  | 106.32  | 105.79  | 105.48  | 105.52  |
| 4.                                 | 105.99 | 105.88  | 105.57  | 104.84  | 104.26  | 103.73  |



# Zestawienie wyników dla board'u 2

MOS\_fed  
tryb kalibracyjny

| Wzmocnienie ładunkowe $K_q$ [mV / fC] |        |         |         |         |         |         |
|---------------------------------------|--------|---------|---------|---------|---------|---------|
| Ch                                    | 0 [pF] | 22 [pF] | 44 [pF] | 66 [pF] | 88 [pF] | 100[pF] |
| 1.                                    | 24.36  | 24.59   | 24.36   | 24.30   | 23.81   | 24.09   |
| 2.                                    | 24.35  | 24.84   | 24.52   | 24.54   | 24.51   | 23.17   |
| 3.                                    | 24.36  | 24.58   | 24.86   | 24.83   | 24.44   | 24.01   |
| 4.                                    | 24.50  | 24.48   | 24.82   | 24.79   | 24.28   | 23.80   |

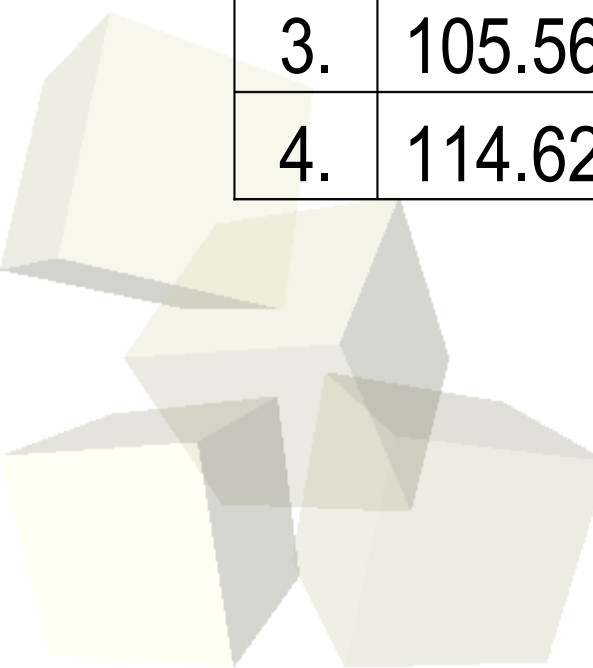




# Zestawienie wyników dla board'u 2

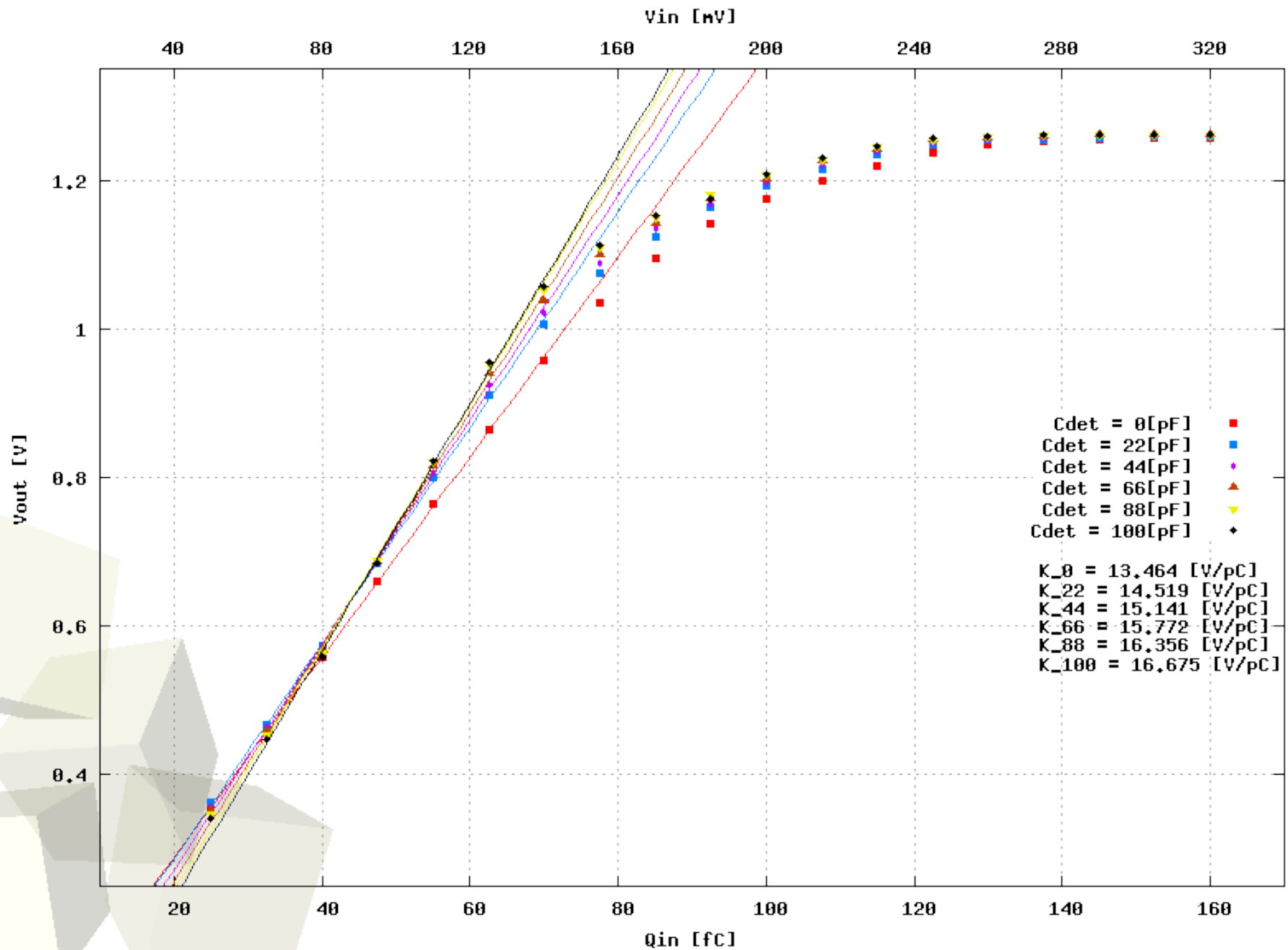
MOS\_fed  
tryb fizyczny

| Wzmocnienie ładunkowe Kq [mV / pC] |        |         |         |         |         |         |
|------------------------------------|--------|---------|---------|---------|---------|---------|
| Ch                                 | 0 [pF] | 22 [pF] | 44 [pF] | 66 [pF] | 88 [pF] | 100[pF] |
| 1.                                 | 106.81 | 106.82  | 106.40  | 106.04  | 105.63  | 105.17  |
| 2.                                 | 109.01 | 108.75  | 108.50  | 108.34  | 107.99  | 107.55  |
| 3.                                 | 105.56 | 105.62  | 105.34  | 105.06  | 104.64  | 104.20  |
| 4.                                 | 114.62 | 114.56  | 114.33  | 113.72  | 113.58  | 112.98  |

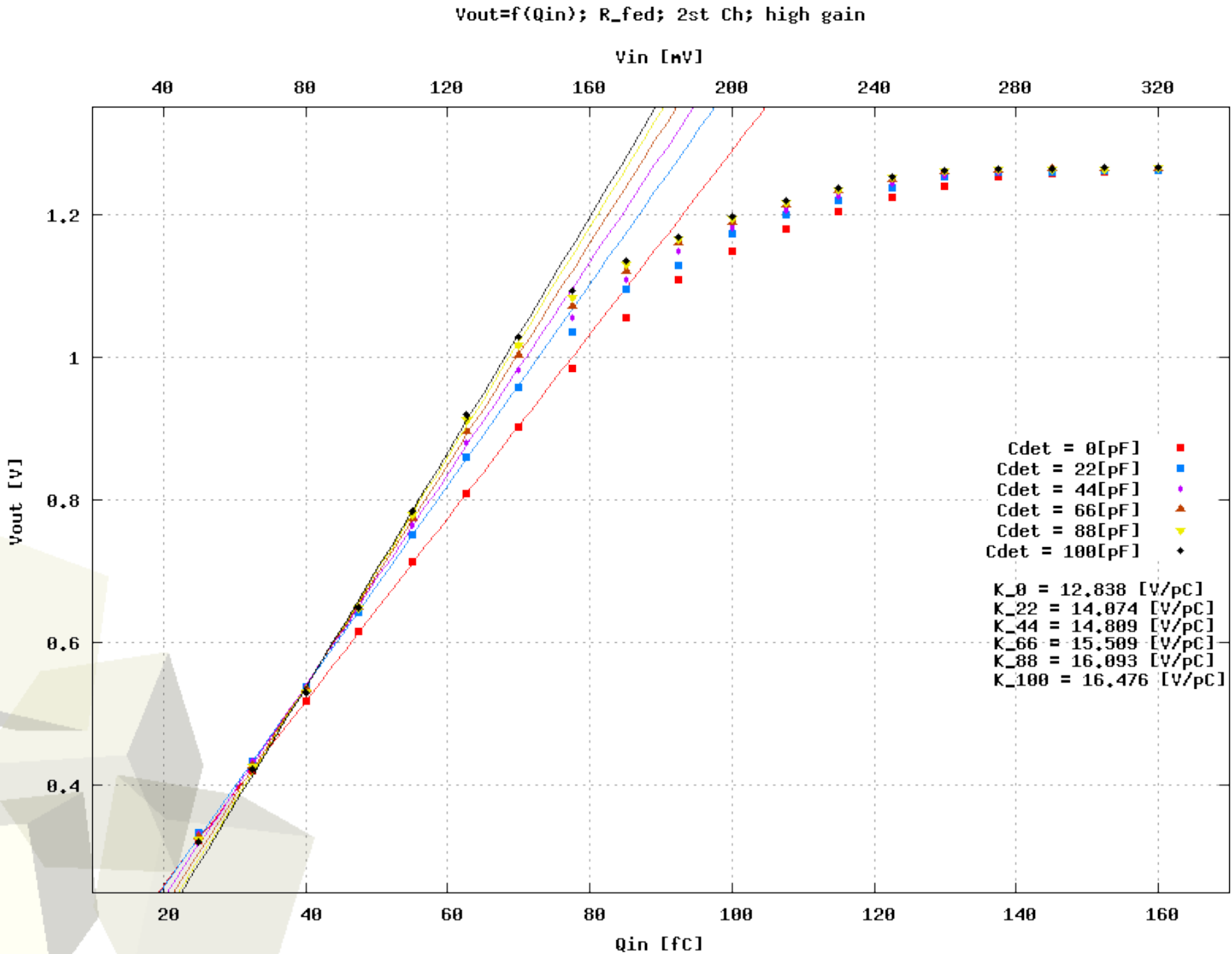


# Zależności $K_q = f(Q_{in})$ ; $R_f$ highG

$V_{out} = f(Q_{in})$ ;  $R_{fed}$ ; 1st Ch; high gain

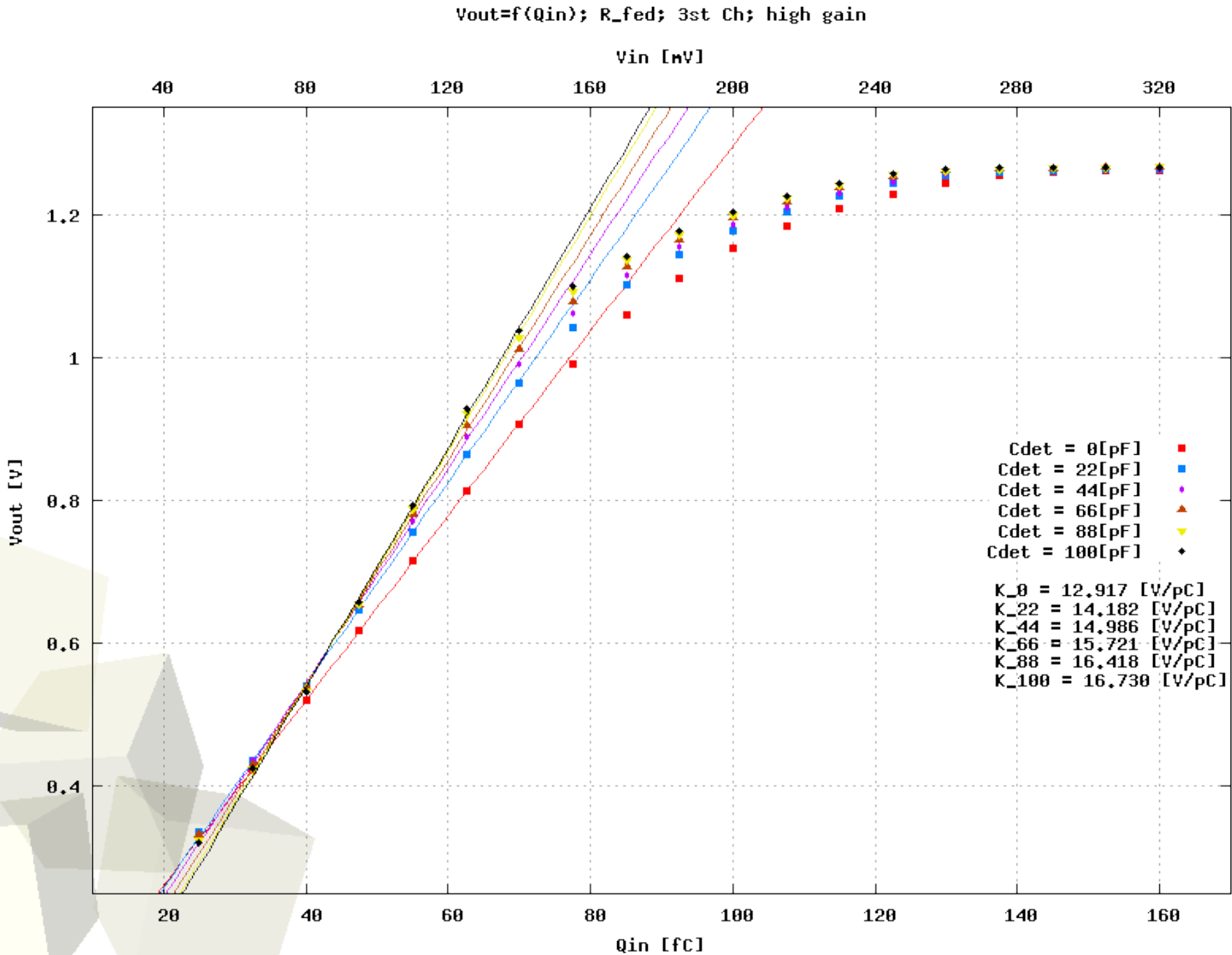


# Zależności $K_q = f(Q_{in})$ ; $R_f$ highG

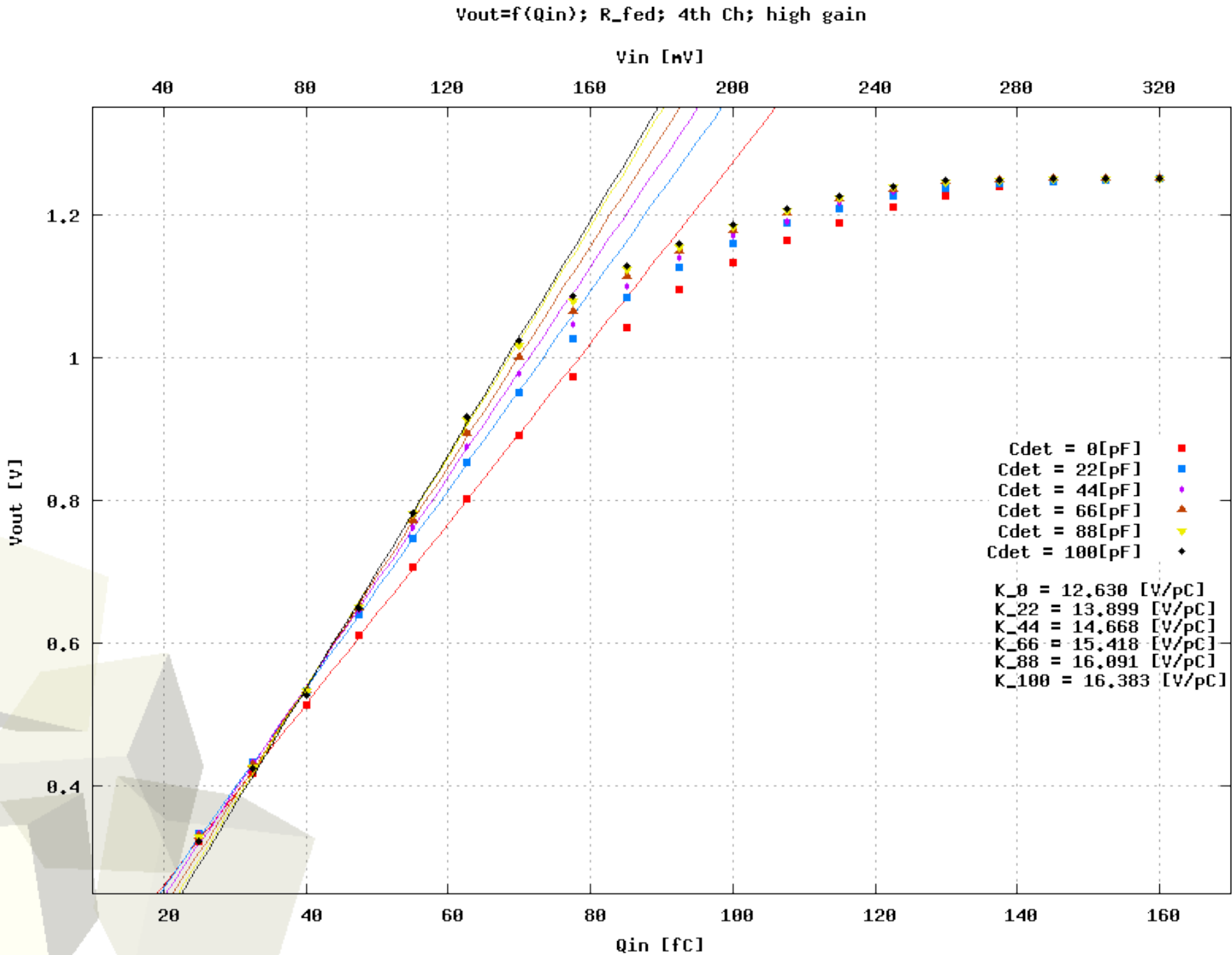




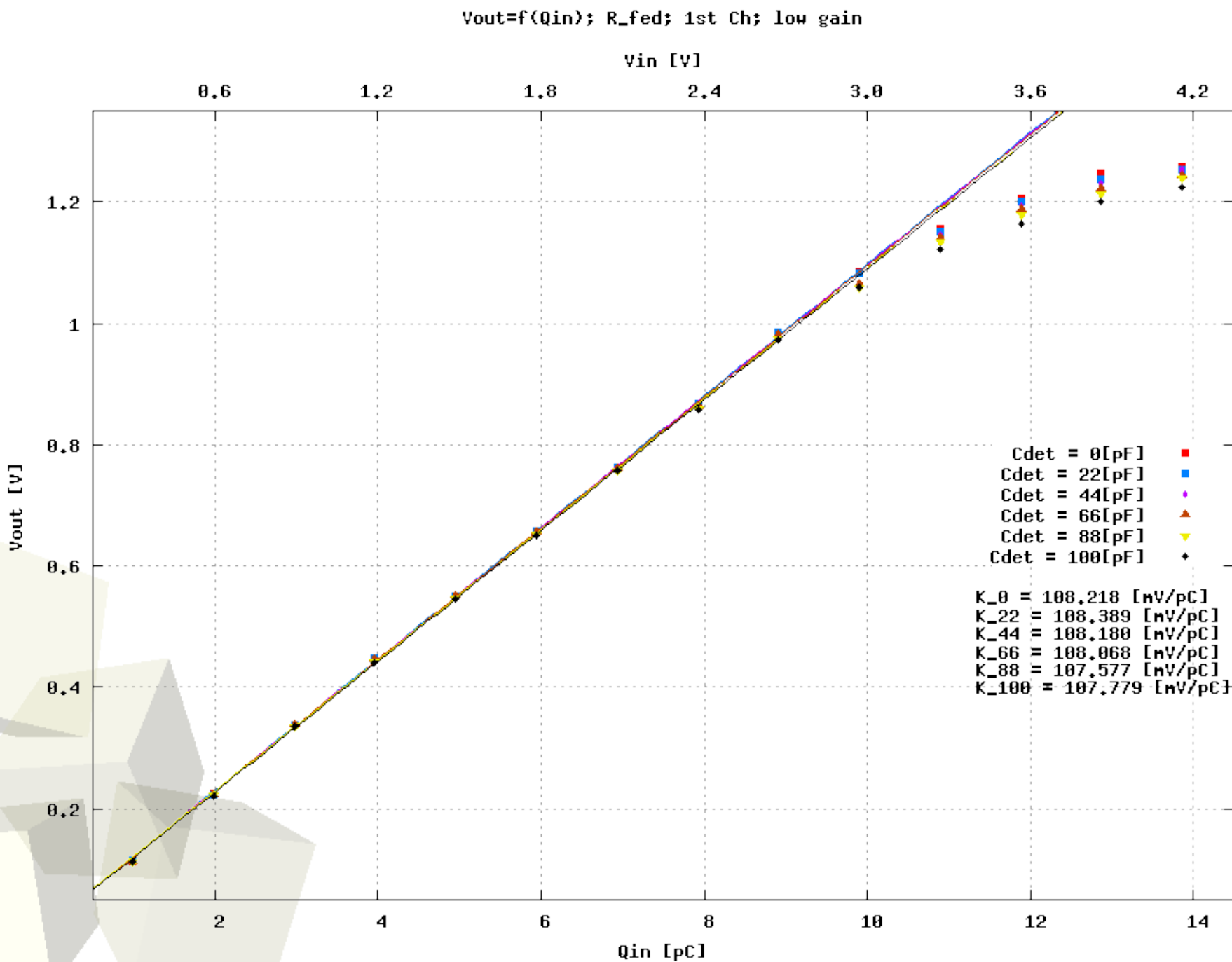
# Zależności $K_q = f(Q_{in})$ ; $R_f$ highG



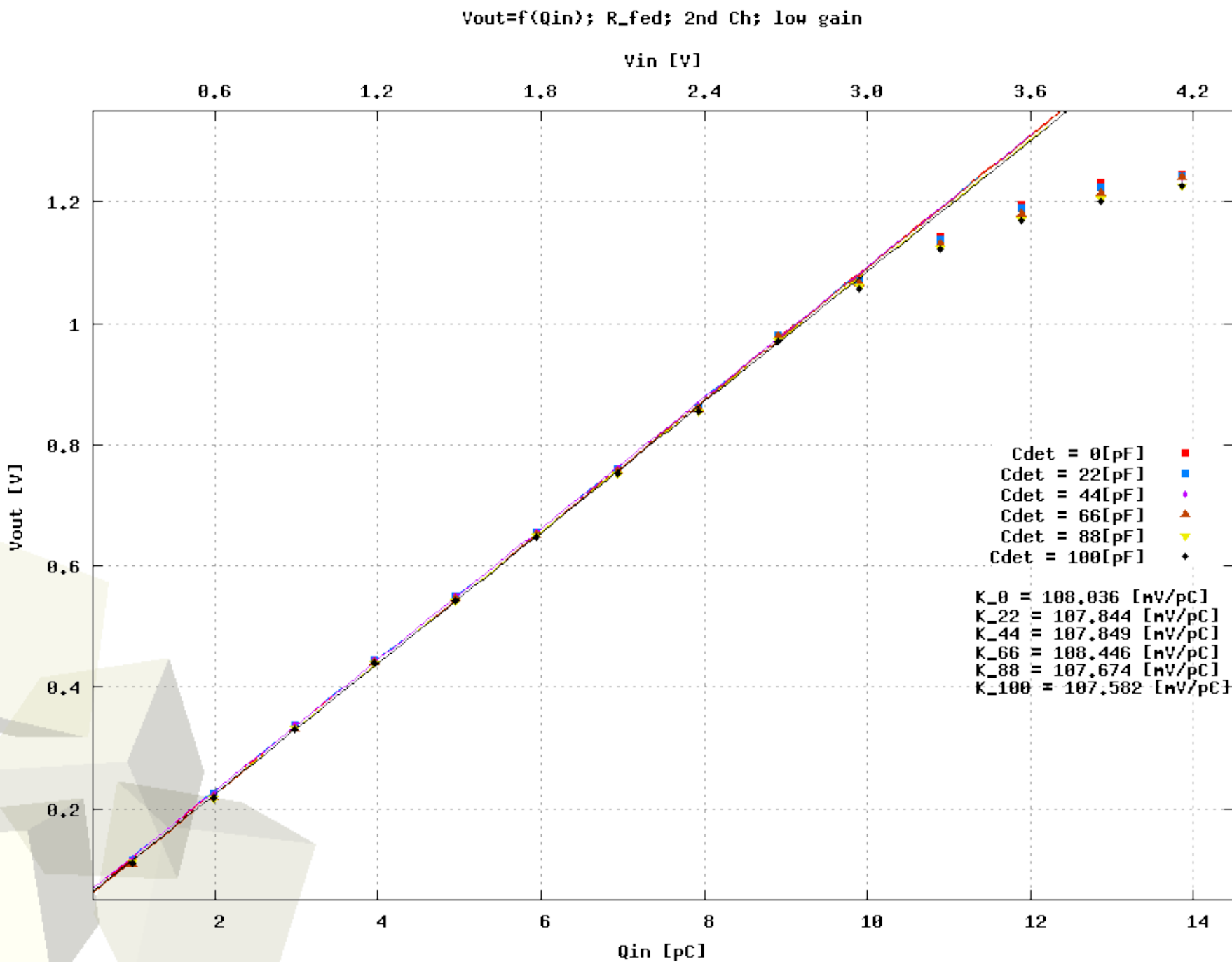
# Zależności $K_q = f(Q_{in})$ ; Rf highG



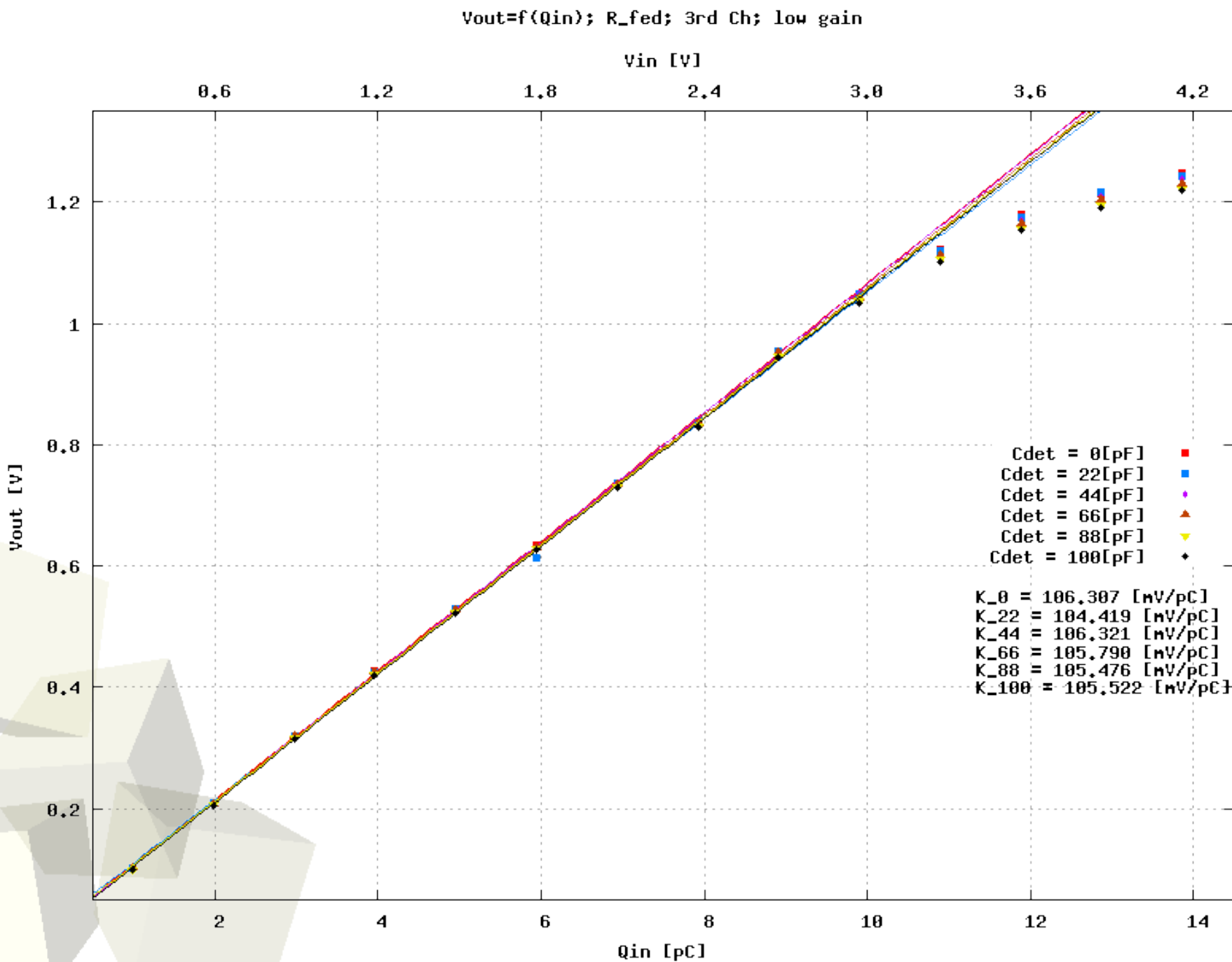
# Zależności $K_q = f(Q_{in})$ ; Rf lowG



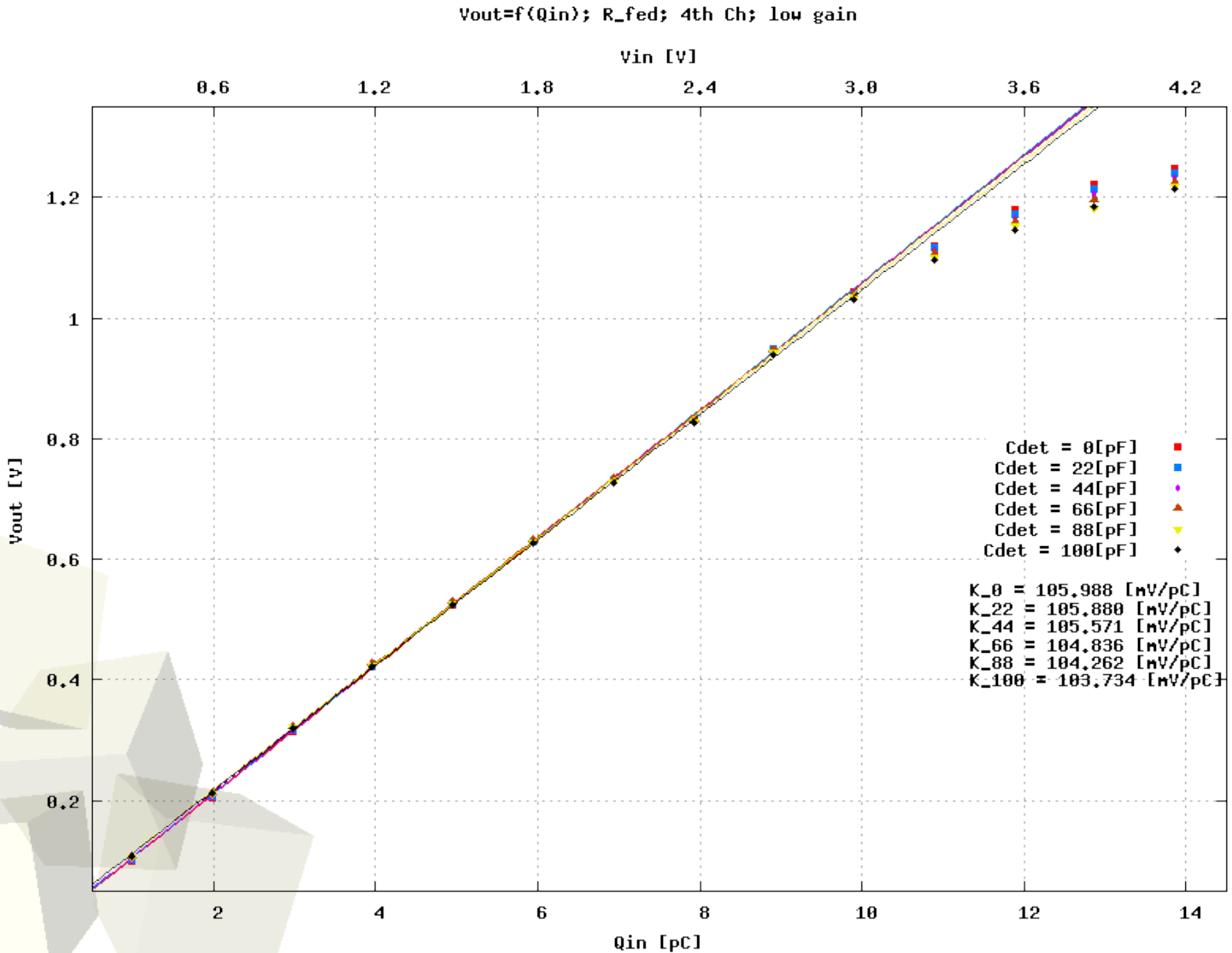
# Zależności $K_q = f(Q_{in})$ ; $R_f$ lowG



# Zależności $K_q = f(Q_{in})$ ; Rf lowG



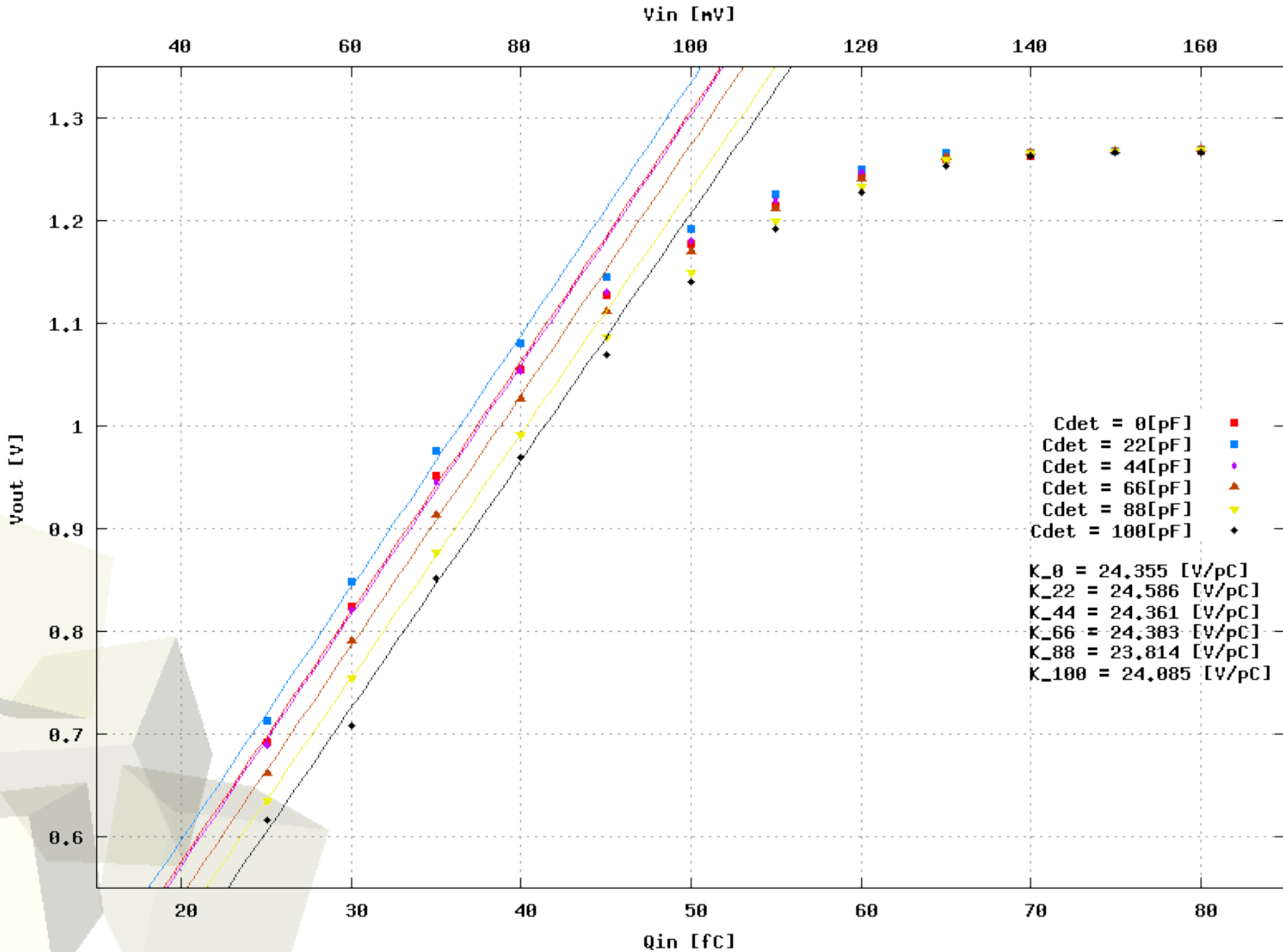
# Zależności $K_q = f(Q_{in})$ ; Rf lowG





# Zależności $K_q = f(Q_{in})$ ; MOSf highG

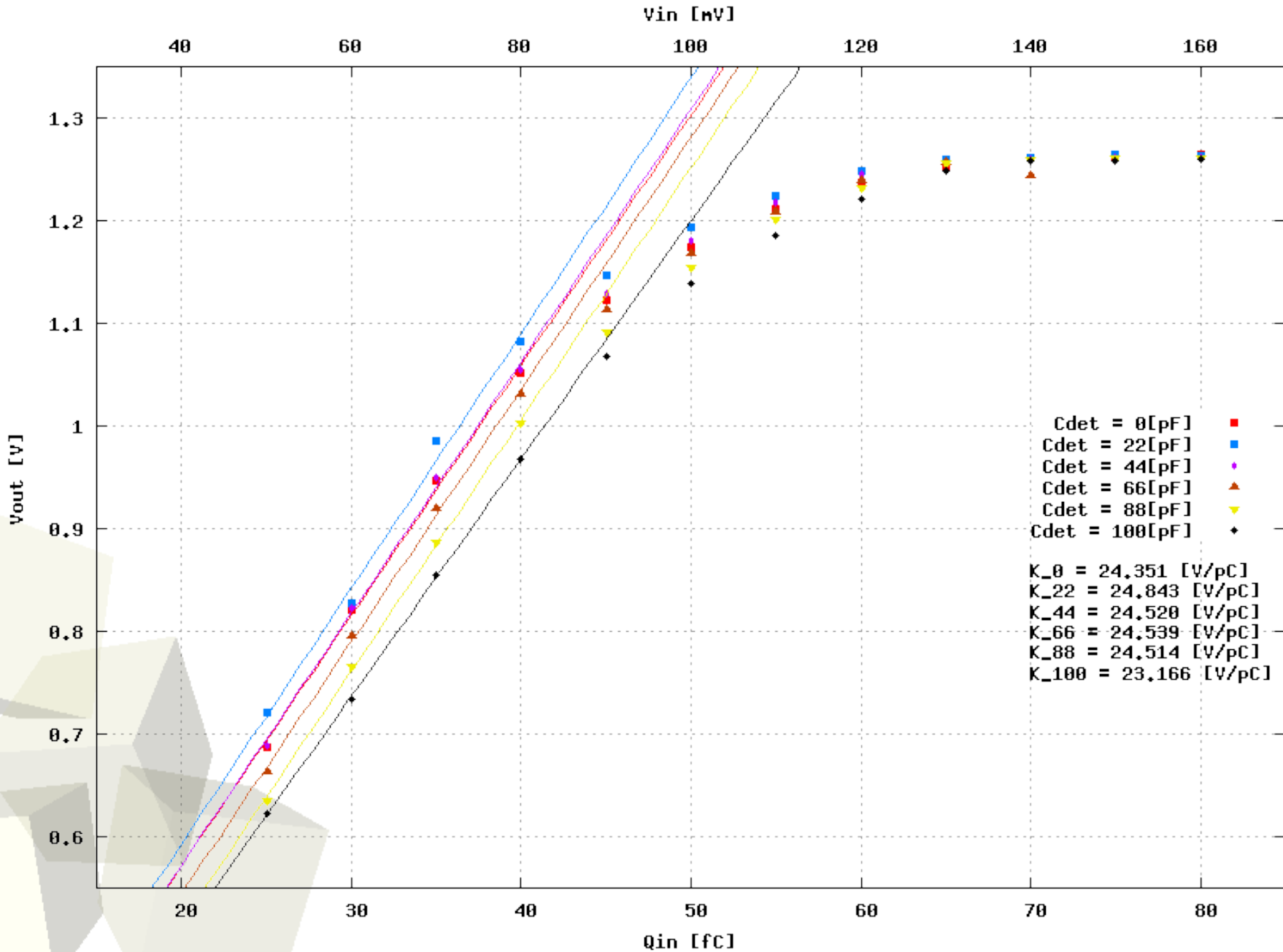
$V_{out} = f(Q_{in})$ ; MOS\_fed; 1st Ch; high gain





# Zależności $K_q = f(Q_{in})$ ; MOSf highG

$V_{out} = f(Q_{in})$ ; MOS\_fed; 2nd Ch; high gain

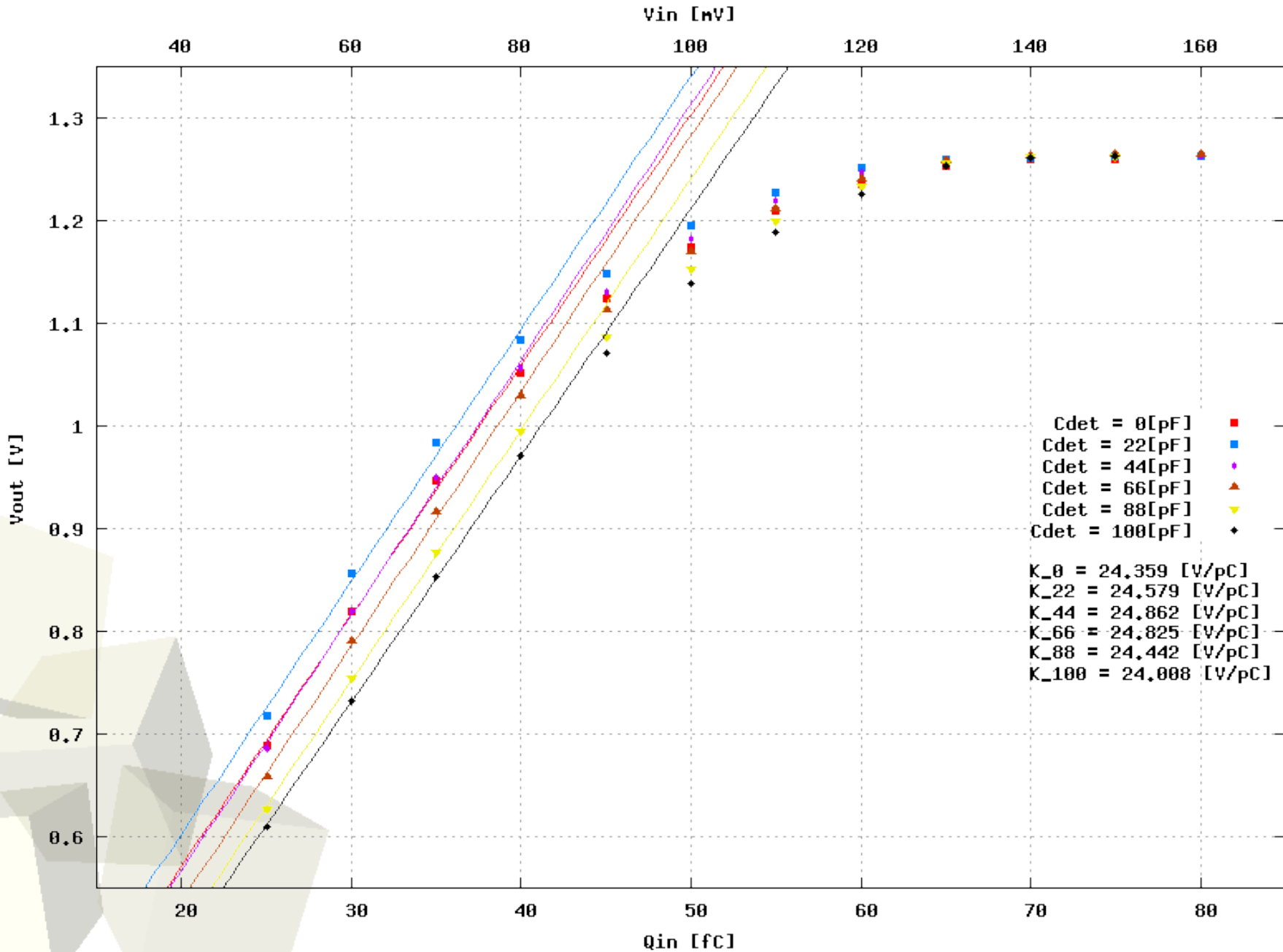






# Zależności $K_q = f(Q_{in})$ ; MOSf highG

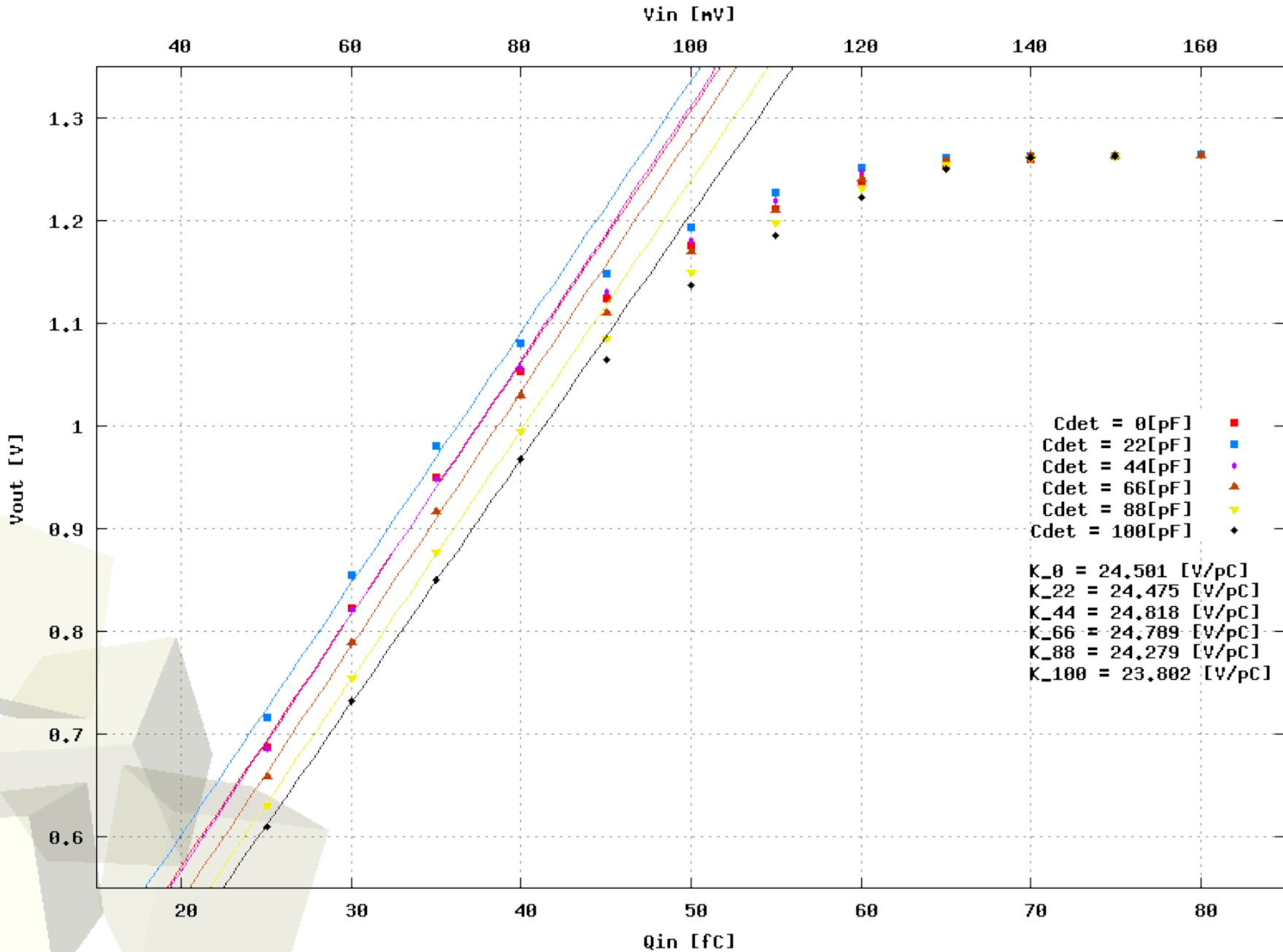
$V_{out} = f(Q_{in})$ ; MOS\_fed; 3rd Ch; high gain

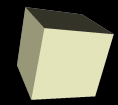




# Zależności $K_q = f(Q_{in})$ ; MOSf highG

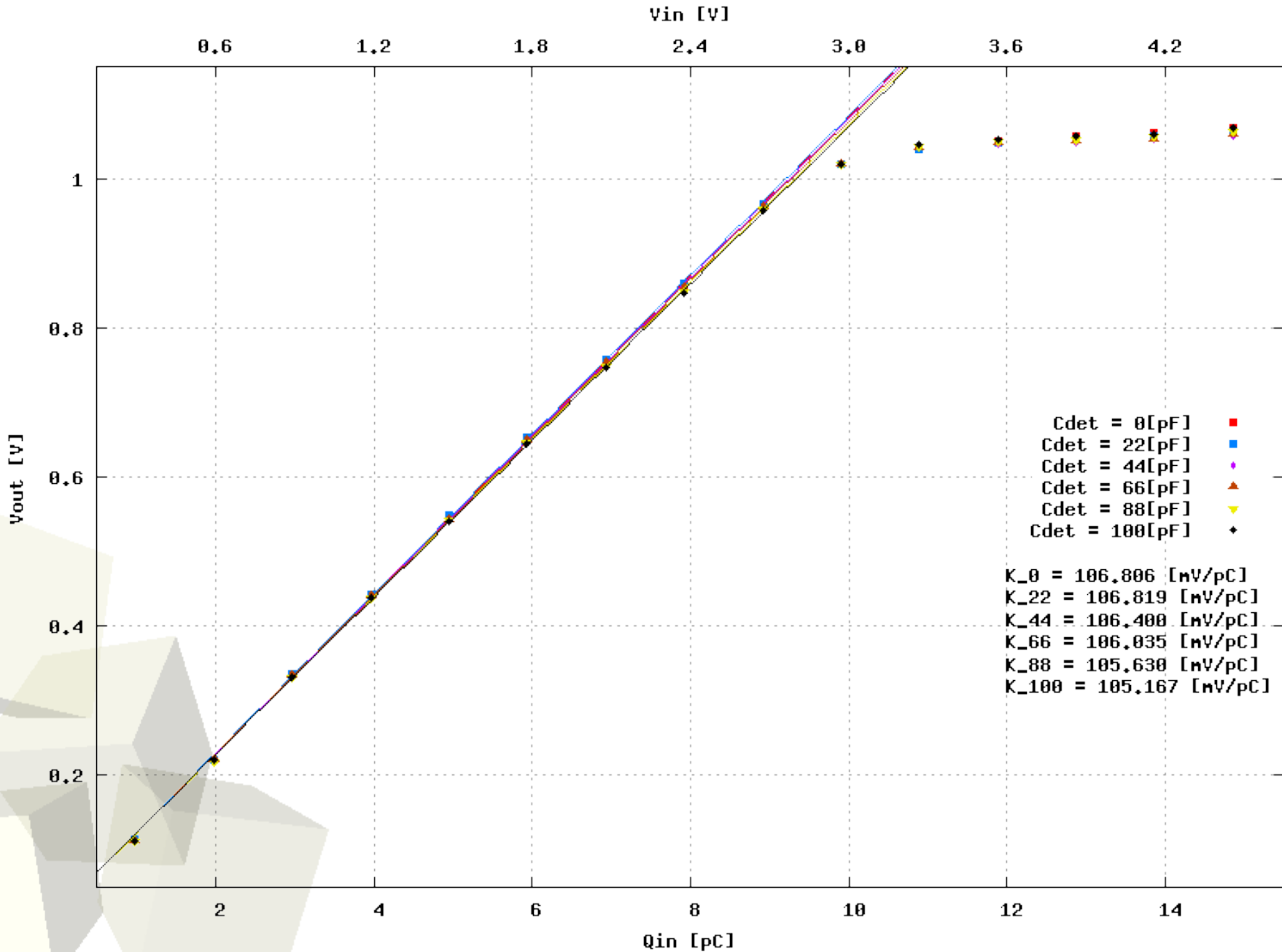
$V_{out} = f(Q_{in})$ ; MOS\_fed; 4th Ch; high gain





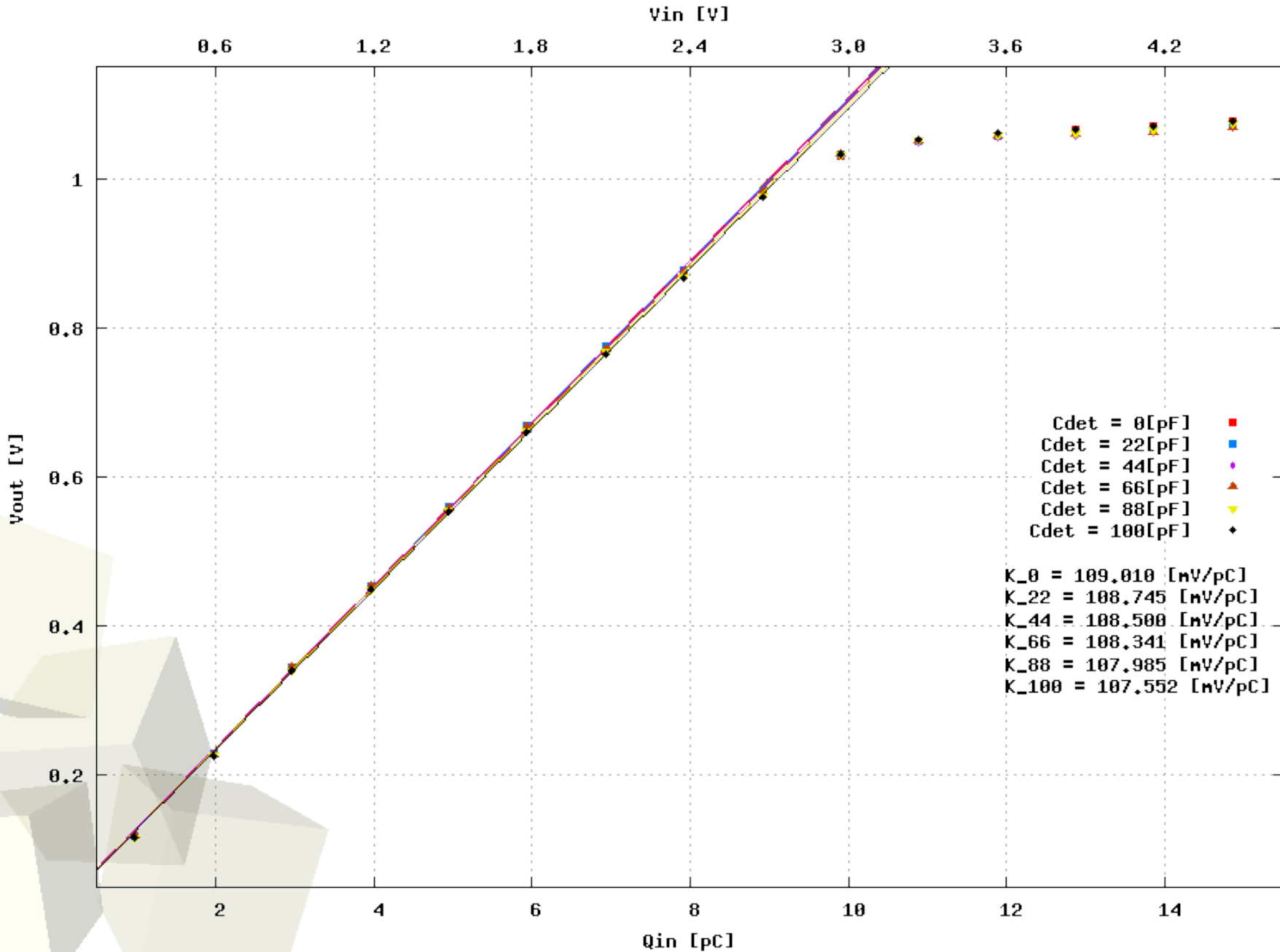
# Zależności $K_q = f(Q_{in})$ ; MOSf lowG

Vout=f(Qin); MOS\_fed; 1st Ch; low gain



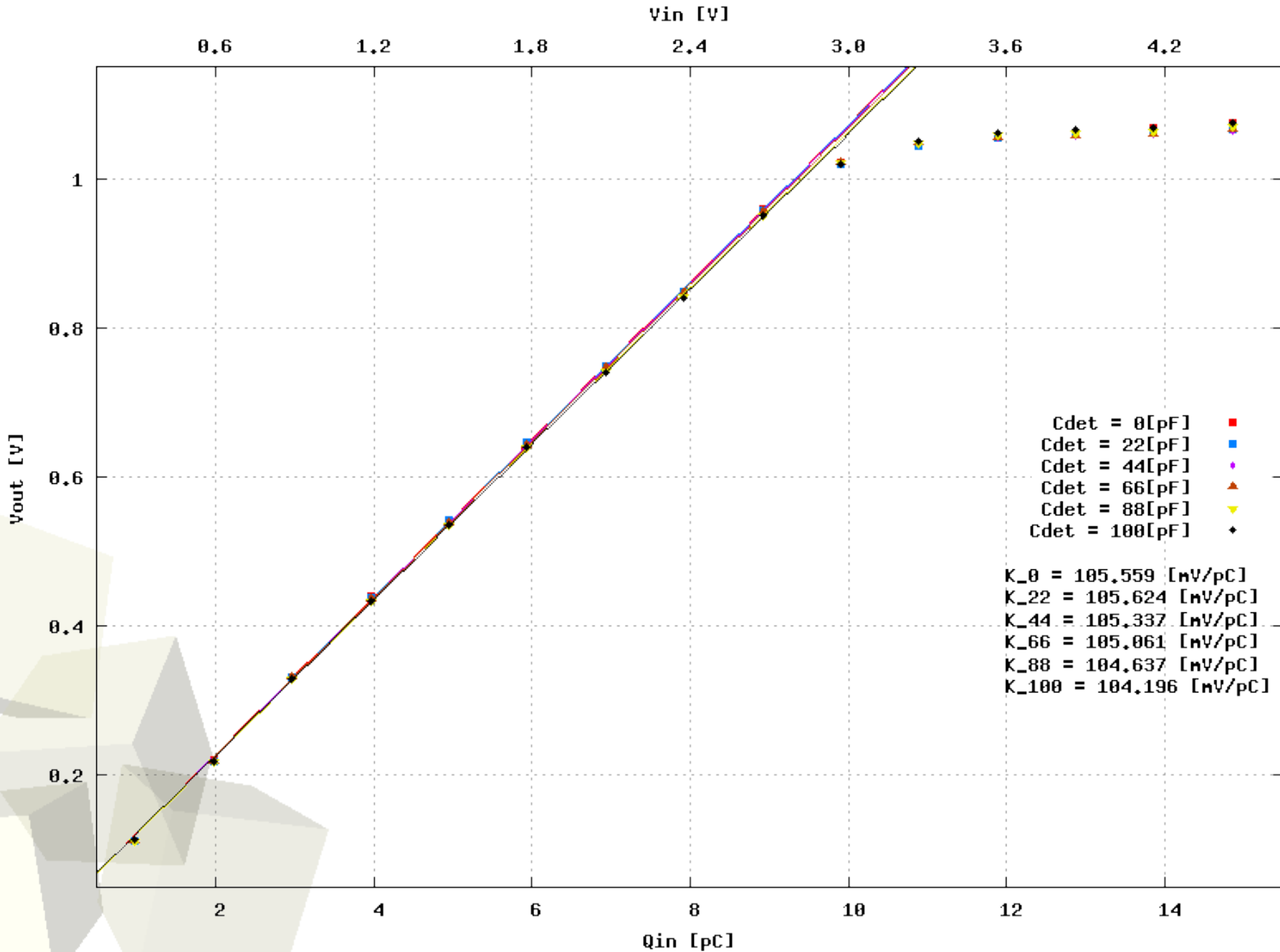
# Zależności $K_q = f(Q_{in})$ ; MOSf lowG

$V_{out} = f(Q_{in})$ ; MOS\_fed; 2nd Ch; low gain



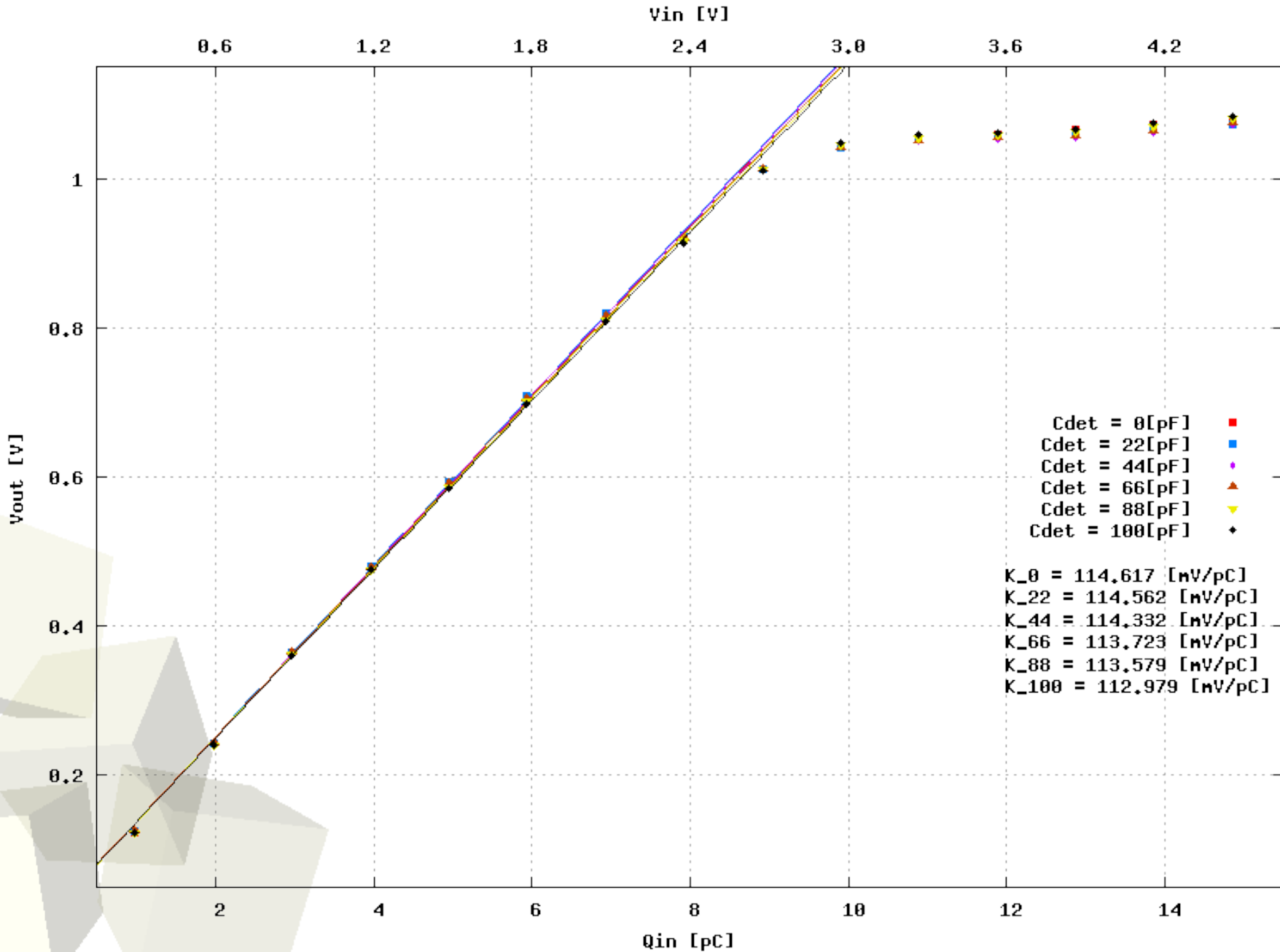
# Zależności $K_q = f(Q_{in})$ ; MOSf lowG

$V_{out} = f(Q_{in})$ ; MOS\_fed; 3rd Ch; low gain



# Zależności $K_q = f(Q_{in})$ ; MOSf lowG

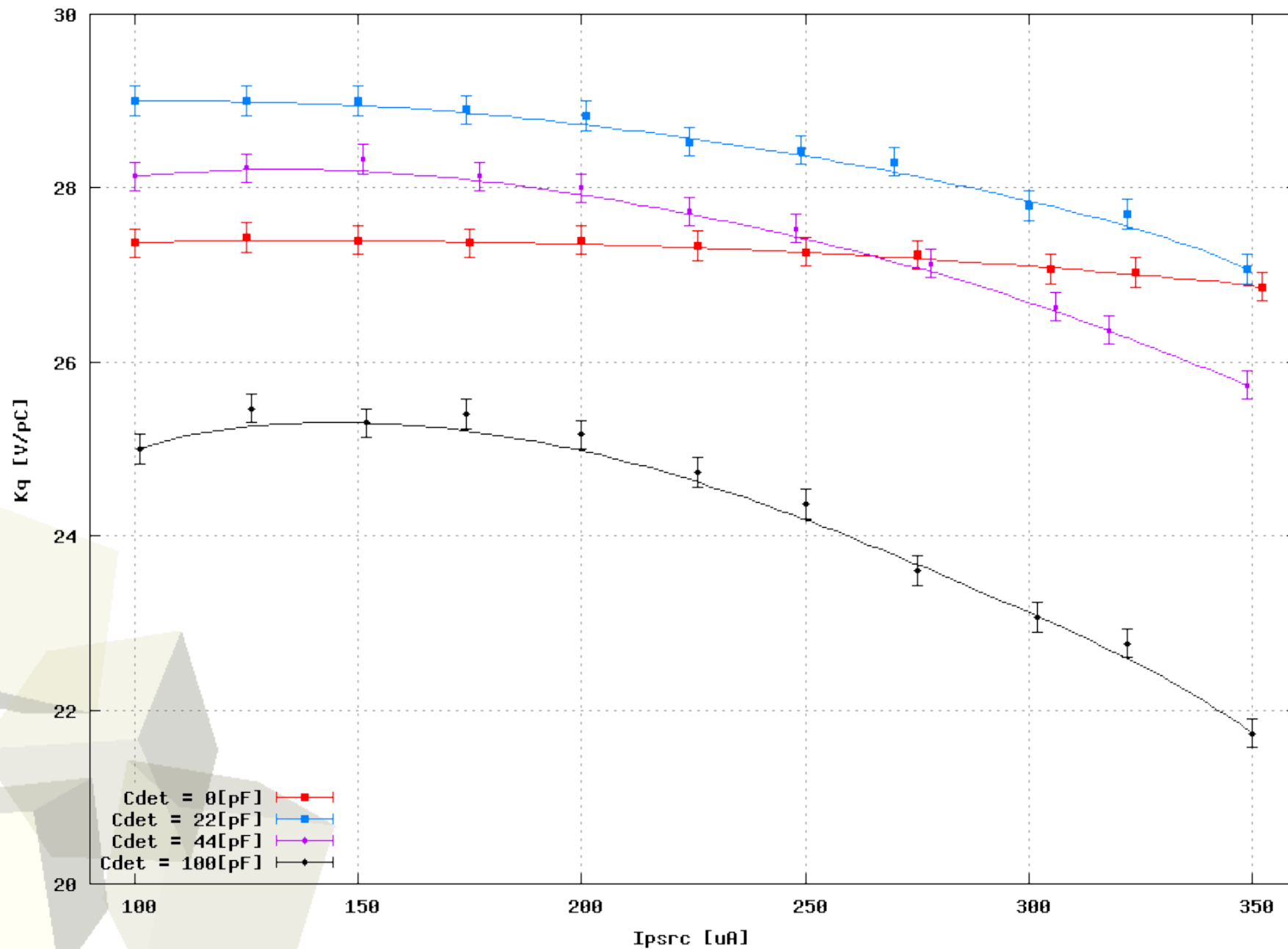
Vout=f(Qin); MOS\_fed; 4th Ch; low gain





# Zależność $Kq = f(I_{psrc})$ MOSf highG

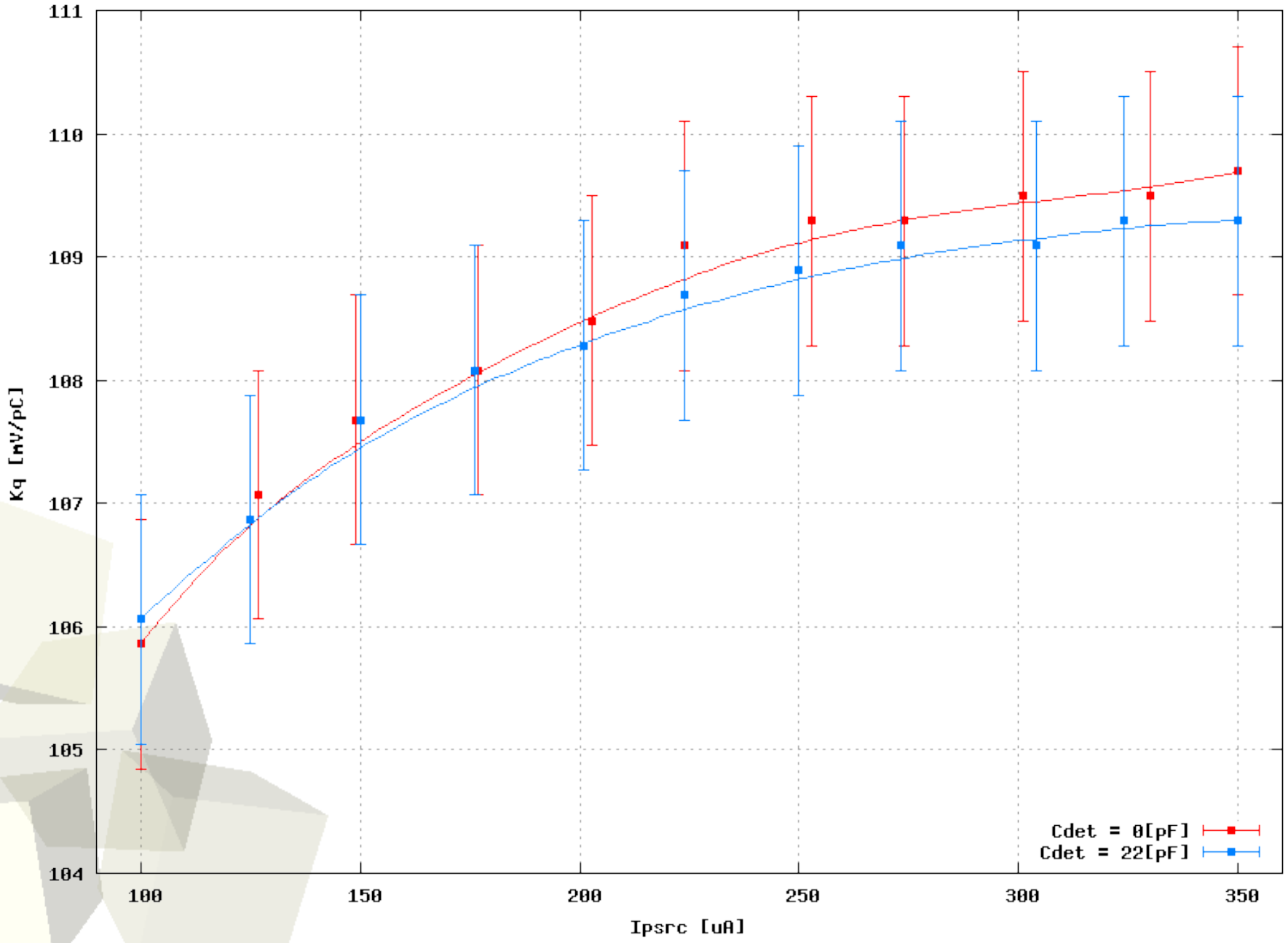
$Kq=f(I_{psrc});$  MOS\_fed; 3st Ch; high gain;  $Q_{in} = 30[fC];$   $I_{ssrc} = 250[uA]$





# Zależność $K_q = f(I_{psrc})$ MOSf lowG

$K_q = f(I_{psrc});$  MOS\_fed; 3st Ch; low gain;  $Q_{in} = 4.95[pC];$   $I_{ssrc} = 250[uA]$

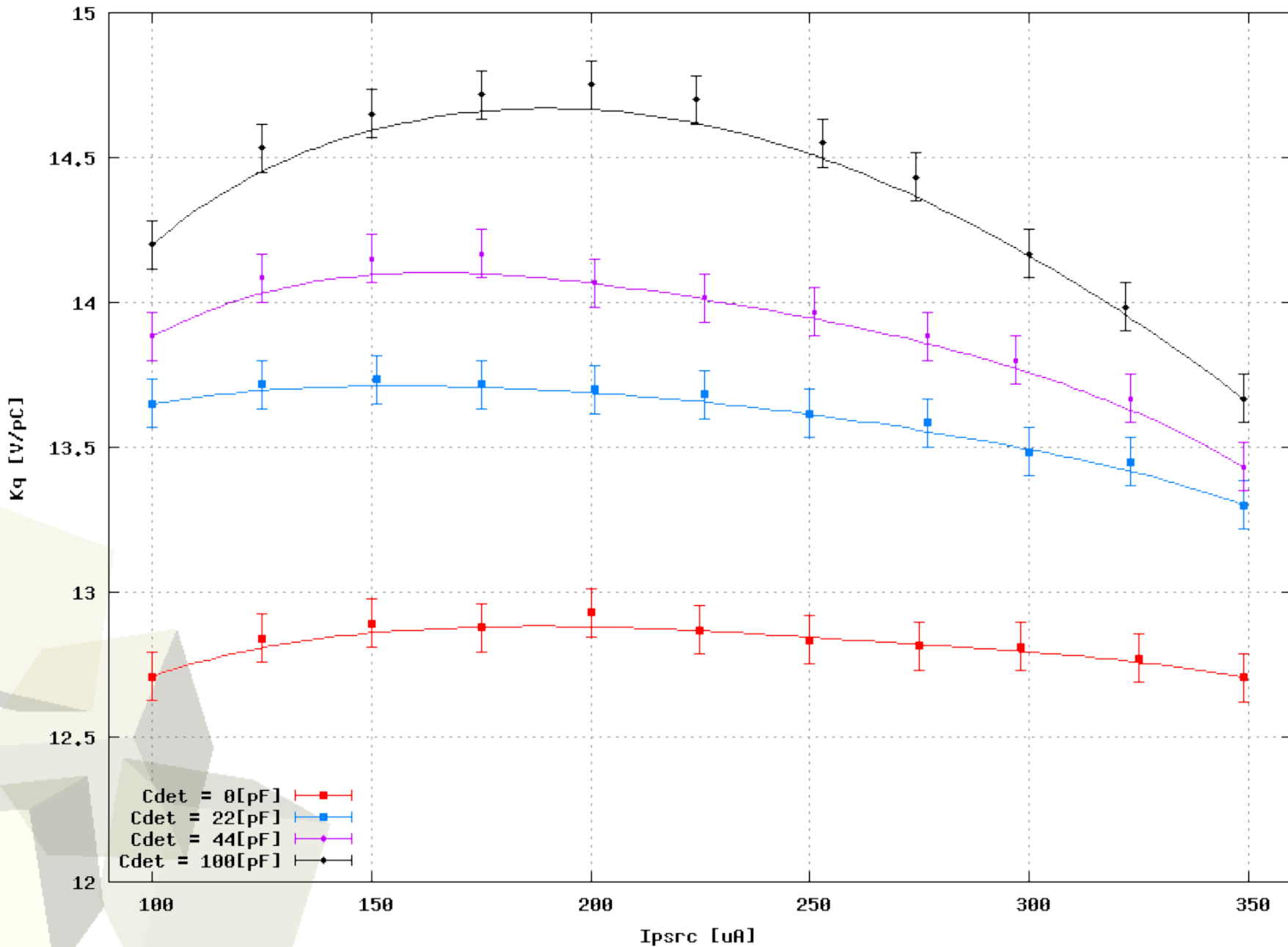






# Zależność $K_q = f(I_{psrc})$ Rf highG

$K_q = f(I_{psrc}); R_{fed}; 3st\ Ch; high\ gain; Q_{in} = 60[fC]; I_{ssrc} = 244[\mu A]$





# Zależność $K_q = f(I_{ssrc})$ Rf highG

$K_q = f(I_{ssrc}); R_{fed}; 3st\ Ch; high\ gain; Q_{in} = 60[fC]; I_{psrc} = 250[uA]$

