Determine the coefficient for increasing filtration resistance for the strip deposit, if viscosity of oil 4.0 mPa·s; the viscosity of water l.2 mPa·s; saturation of bound water - 0.28 and residual oil saturation - 0.22.

Data:

μ_{oil}=4.0 mPa·s

μ_w=1.2 mPa·s

s_w=0,28

s_r=0,22

α=?

$$a = \frac{\mu_w}{\mu_{oil}} \cdot (1{,}7 + 8 \cdot z_f + 25 \cdot z_f{}^2)$$

$$\mu_r = \frac{\mu_{oil}}{\mu_w} = 3{,}33 \text{ -relative viscosity}$$

$$z_f = 0{,}1 \cdot \sqrt{\frac{\mu_r}{1{,}5 \cdot (1 - s_w - s_r) - z_f}} \qquad (1)$$

$$1 - s_w - s_r = \frac{1}{1{,}5} \cdot \left(\frac{0{,}01 \cdot \mu_r}{z_f{}^2} + z_f \right) \qquad (2)$$

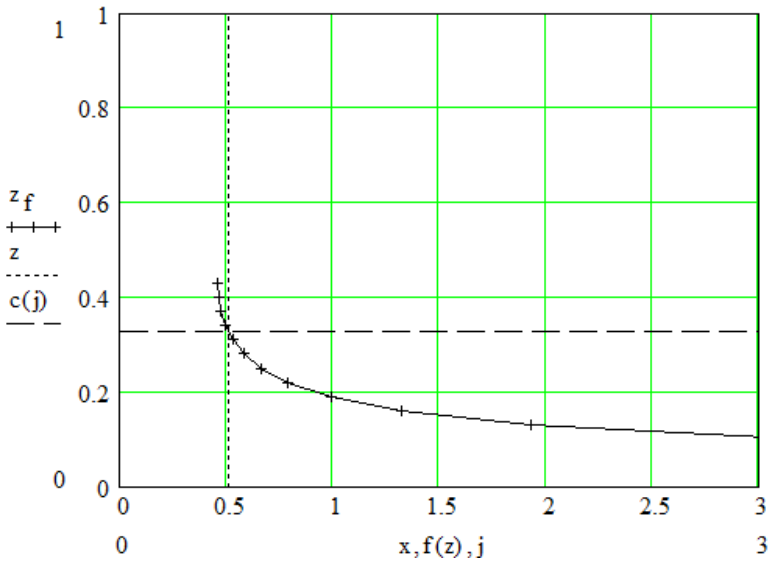
$$1 - s_w - s_r = \frac{1}{1{,}5} \cdot \left(\frac{0{,}01 \cdot 3{,}33}{0{,}1^2} + 0{,}1 \right) = 2{,}287$$

$$1 - s_w - s_r = \frac{1}{1{,}5} \cdot \left(\frac{0{,}01 \cdot 3{,}33}{0{,}2^2} + 0{,}2 \right) = 0{,}688$$

$$1 - s_w - s_r = \frac{1}{1{,}5} \cdot \left(\frac{0{,}01 \cdot 3{,}33}{0{,}3^2} + 0{,}3 \right) = 0{,}44667$$

$$1 - s_w - s_r = f(z_f)$$

z_f	$1-s_w-s_r=f(z_f)$
0,1	2,287
0,2	0,688
0,3	0,44667
0,4	0,41
0,5	0,422
0,8	0,568
0,9	0,627



$1-s_w-s_r=f(z_f)$=0,5

z_f =0,33

$$a=\frac{\mu_w}{\mu_{oil}}\cdot(1{,}7+8\cdot z_f+25\cdot z_f{}^2)$$

$$a=\frac{1{,}2}{4}\cdot(1{,}7+8\cdot 0{,}33+25\cdot 0{,}33^2)=2{,}1187$$