In [1]:
```
from numpy import exp
from scipy.optimize import fsolve

conductivity = 1.56
heat_capacity = 4190000
sed_temp_shallow = 19.87
sed_temp_mid = 17.53
sed_temp_deep = 16.21
shallow_mid_dist = 0.3
mid_deep_dist = 0.7

expected = 0.0807

estimate = 1
```

In [2]:
```
func = lambda x: ((sed_temp_mid - sed_temp_shallow) / (sed_temp_deep - sed_temp_shallow) - (
            (exp(x * (shallow_mid_dist / mid_deep_dist)) - 1) / (exp(x) - 1)))
```

In [3]:
```
solve_solution = fsolve(func, estimate)
```

In [4]:
```
print(len(solve_solution))
if len(solve_solution) == 1:
    C27 = solve_solution[0]
    qz = (-1 * conductivity * C27 * 86400) / (heat_capacity * mid_deep_dist)
    print(f"Expected: {expected}")
    print(f"Actual:   {qz}")
```

```
1
Expected: 0.0807
Actual:   0.08072639033654952
```

In [ ]: