```
interface(showassumed = 0) :
mykernel := Heaviside(t)/τ · exp(K t/τ);
with(inttrans) :
 assume(τ > 0) :
 kernelFour := fourier(mykernel, t, ω)
```

$$mykernel := \frac{\mathrm{Heaviside}(t)\, e^{K \frac{t}{\tau}}}{\tau}$$

$$kernelFour := \frac{1}{I\,\omega\,\tau + 1} \tag{1}$$

```
stdpRO := Heaviside(t)/τ_p  A`_+`· exp(K t/τ_p);
stdpOR :=K Heaviside(t)/τ_m  A_K· exp(K t/τ_m);
with(inttrans) :
 assume(τ_p > 0, τ_m > 0) :
stdpFourRO :=  fourier(stdpRO, t, ω);
stdpFourOR :=  fourier(stdpOR, t, ω)
```

$$stdpRO := \frac{\mathrm{Heaviside}(t)\, A_+\, e^{K \frac{t}{\tau_p}}}{\tau_p}$$

$$stdpOR := K \frac{\mathrm{Heaviside}(t)\, A_-\, e^{K \frac{t}{\tau_m}}}{\tau_m}$$

$$stdpFourRO := \frac{A_+}{I\,\omega\,\tau_p + 1}$$

$$stdpFourOR := K \frac{A_-}{I\,\omega\,\tau_m + 1} \tag{2}$$

=

```
to_integrate := 1/(2 π)·(
        eval(stdpFourRO, ω =K ω)·kernelFour^α·conjugate(kernelFour^β) +
        stdpFourOR·kernelFour^α·conjugate(kernelFour^β)) :

# antisymm M10 inh-exc
```

```
 to_integrate_eval := eval(to_integrate, [α = 1, β = 0]) :
assume(τ_p > 0, τ_m > 0 , τ > 0 ) :
res := int(to_integrate_eval, ω =K ∞..∞) :
 simplify(res, power, symbolic)
```

$$\frac{A_{+}}{\tau_p + \tau} \tag{3}$$

#antisymm M01 exc-inh

```
 to_integrate_eval := eval(to_integrate, [α = 0, β = 1]) :
assume(τ_p > 0, τ_m > 0 , τ > 0 ) :
res := int(to_integrate_eval, ω =K ∞..∞) :
 simplify(res, power, symbolic)
```

$$K\,\frac{A_{-}}{\tau_m + \tau} \tag{4}$$

 # Now again for the symmetric

$$stdpsymm := \frac{1}{2\cdot \tau_p} \quad A_{`+`}\cdot\ \exp\left(K\,\frac{\mathrm{abs}(t)}{\tau_p}\right) K\ \frac{1}{2\cdot \tau_m} \quad A_{K}\cdot\ \exp\left(K\,\frac{\mathrm{abs}(t)}{\tau_m}\right) ;$$

```
with(inttrans) :
 assume(τ_p > 0, τ_m > 0) :
 stdpsymmFour := fourier(stdpsymm, t, ω)
```

$$stdpsymm := \frac{A_{+}\,e^{K\frac{|t|}{\tau_p}}}{2\,\tau_p} K\ \frac{A_{-}\,e^{K\frac{|t|}{\tau_m}}}{2\,\tau_m}$$

$$stdpsymmFour := \frac{K\,A_{-}\,\omega^2\,\tau_p^{\ 2} + A_{+}\,\omega^2\,\tau_m^{\ 2} K\ A_{-} + A_{+}}{\left(\omega^2\,\tau_m^{\ 2} + 1\right)\,\left(\omega^2\,\tau_p^{\ 2} + 1\right)} \tag{5}$$

$$to\_integrate\_symm := \frac{1}{2\ \pi}\cdot\left(\mathrm{stdpsymmFour}\cdot\mathrm{kernelFour}^{\alpha}\cdot\mathrm{conjugate}\left(\mathrm{kernelFour}^{\beta}\right)\right) :$$

```
# Symmetric, M10 inh to exc
#The order is given by alpha and beta
 to_integrate_eval := eval(to_integrate_symm, [α = 1 , β = 0]) :
```

assume($\tau_p > 0$, $\tau_m > 0$, $\tau > 0$) :
res := int(*to_integrate_eval*, $\omega = \mathrm{K}\ \infty..\infty$) :
Mcoef = *simplify*(res, power, symbolic)

$$Mcoef = \frac{\left(\mathrm{K}\,A_{-} + A_{+}\right)\,\tau\,\mathrm{K}\ A_{-}\,\tau_p + A_{+}\,\tau_m}{2\,\left(\tau_p + \tau\right)\,\left(\tau_m + \tau\right)} \tag{6}$$

 # Symmetric, M01 , exc to inh

```
to_integrate_eval ≔ eval(to_integrate_symm, [α = 0 , β = 1]) :

assume(τ_p > 0, τ_m > 0 , τ > 0 ) :
res ≔ int(to_integrate_eval, ω =K ∞ .. ∞ ) :
 Mcoef = simplify(res, power, symbolic)
```

$$Mcoef = \frac{(\mathrm{K}\, A_{-} + A_{+})\,\tau \mathrm{K}\, A_{-}\,\tau_p + A_{+}\,\tau_m}{2\,(\tau_p + \tau)\,(\tau_m + \tau)} \tag{7}$$