Example 1: Amplitude model

```
begin
    using NumericalDistributions
    using HadronicLineshapes
    using DistributionsHEP
    using Distributions
    using Plots
end
```

```
theme(:boxed)
```

```
begin
    # this code should go to NumericalDistributions
    #
    struct Abs2 <: AbstractFlexFunc
        F
    end
    (o::Abs2)(x) = abs2(o.F(x))

    struct ofAbs2 <: AbstractFlexFunc
        F
    end
    (o::ofAbs2)(x) = o.F(x^2)
end
```

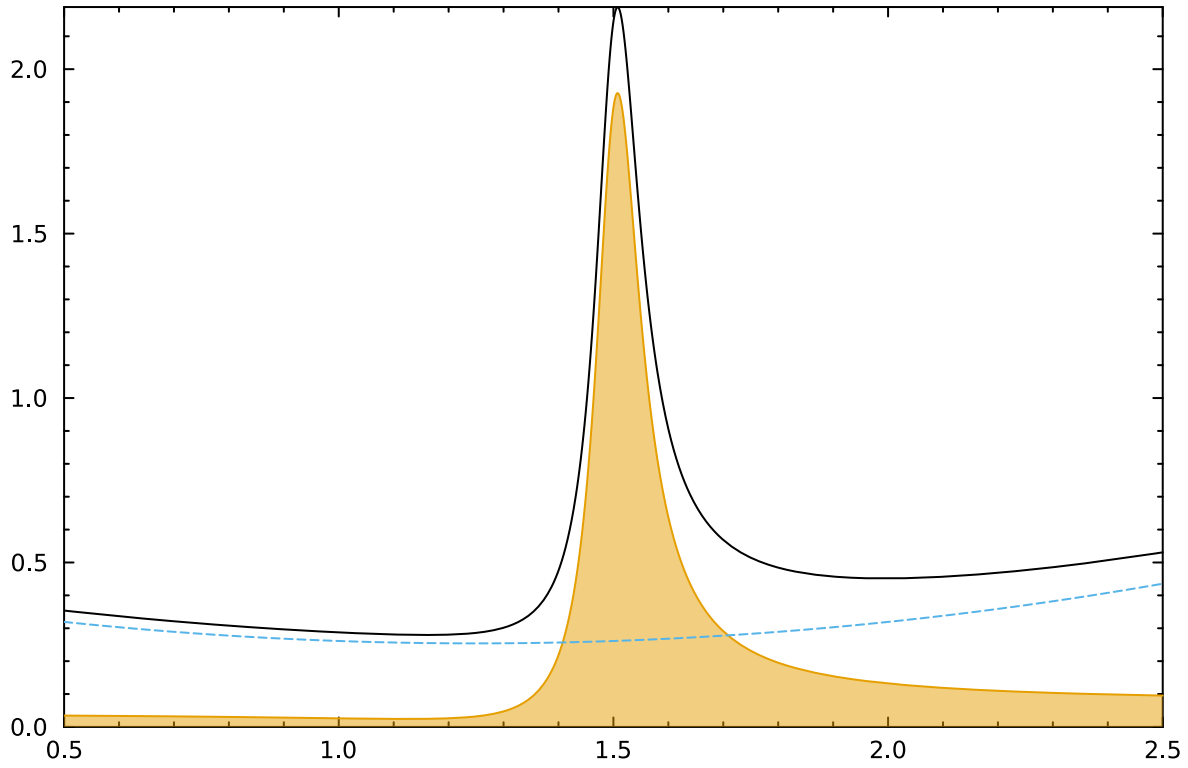
```
model = let

    m = 1.5
    Γ = 0.1
    c0, c1 = 1.1, 0.02
    b0, b1, b2 = 1.1,0.2,0.2

    complex_phase = 1.0*cis(3π/4)
    f1 = 0.4
    f2 = 1-f1

    # range
    a = 0.5
    b = 2.5

    # |BW * complex_phase + B|² + C
    #
    BW = BreitWigner(; m, Γ, ma=0,mb=0,l=0,d=1.0)
    BW_of_m = ofAbs2(BW)
    coherent_background = WrapFlexFunction(x->c0 + x*c1)
    full_amplitude = Abs2(BW_of_m * complex_phase + coherent_background)
        #
    D1 = NumericallyIntegrable(full_amplitude, (a, b))
    D2 = Chebyshev([b0, b1, b2], a, b)
    MixtureModel([D1, D2], [f1, f2])
end;
```




```
let
    (; lb, ub) = support(model)
    plot(x->pdf(model, x), lb, ub)
    plot!(x->pdf(model.components[1], x) * model.prior.p[1], lb, ub, fill=0,
    fillalpha=0.5)
    plot!(x->pdf(model.components[2], x) * model.prior.p[2], lb, ub, ls=:dash)
end
```