

```

# Taller: Rstudio Aplicado a Finanzas
# Colegio de Economistas de Loreto
# Profesor: Jose Rodney Menezes De la Cruz

#=====
# Sesión 4 "Matematica Financiera Aplicada"
#=====

#=====
# I. Instalacion del paquete financiero
#=====

install.packages("FinancialMath")
library(FinancialMath)

#=====
# II. Valor temporal del dinero
#=====

# Valor temporal del dinero

TVM(pv=10, fv=20, i=.05, ic=2, plot=TRUE)
TVM(pv=50, n=5, i=.04, plot=TRUE)

#=====
# III. Rendimiento
#=====

# Rendimiento ponderado en dólares

yield.dollar(cf=c(20,10,50), times=c(.25, .5, .75), start=100, end=175, endtime
=1)
yield.dollar(cf=c(500, -
1000), times=c(3/12, 18/12), start=25200, end=25900, endtime=21/12)

#Rendimiento ponderado en el tiempo

yield.time(cf=c(0,200,100,50), bal=c(1000,800,1150,1550,1700))

#=====
# Iv. Convertir tasas
#=====

# Convertidor de tasas de intereses y descuentos

rate.conv(rate=.05, conv=2, nom=1)
rate.conv(rate=.05, conv=2, nom=4, type="discount")
rate.conv(rate=.05, conv=2, nom=4, type="force")

#=====
# v. VAN y TIR
#=====

# Valor Presente Neto (VAN)

NPV(cf0=100, cf=c(50,40), times=c(3,5), i=.01)
NPV(cf0=100, cf=50, times=3, i=.05)

```

```

NPV(cf0=100,cf=c(50,60,10,20),times=c(1,5,9,9),i=.045)

# Tasa interna de retorno (TIR)

IRR(cf0=1,cf=c(1,2,1),times=c(1,3,4))
IRR(cf0=100,cf=c(1,1,30,40,50,1),times=c(1,1,3,4,5,6),plot=T)

#=====
# vI. Bonos
#=====

# Análisis de bonos

bond(f=100,r=.04,c=100,n=20,i=.04,ic=1,cf=1,t=1)
bond(f=100,r=.05,c=110,n=10,i=.06,ic=1,cf=2,t=5,plot=T)

#=====
# vII. Flujo de caja
#=====

# Análisis de flujo de caja

cf.analysis(cf=c(1,1,101),times=c(1,2,3),i=.04,time.d=TRUE)
cf.analysis(cf=c(5,1,5,45,5),times=c(5,4,6,7,5),i=.06,plot=TRUE)

#=====
# vIII. Amortizaciones
#=====

# Periodo de amortización

amort.period(Loan=100,n=5,i=.01,t=3)
amort.period(n=5,pmt=30,i=.01,t=3,pf=12)
amort.period(Loan=100,pmt=24,ic=1,i=.01,t=3)

# Tabla de amortización

amort.table(Loan=1000,n=2,i=.005,ic=1,pf=1)
amort.table(Loan=100,pmt=40,i=.02,ic=2,pf=2,plot=FALSE)
amort.table(Loan=NA,pmt=102.77,n=10,i=.005,plot=TRUE)

#=====
# IX. Anualidades
#=====

# Anualidad Aritmética

annuity.arith(pv=NA,fv=NA,n=20,p=100,q=4,i=.03,ic=1,pf=2,imm=TRUE)
annuity.arith(pv=NA,fv=3000,n=20,p=100,q=NA,i=.05,ic=3,pf=2,imm=FALSE,plot=T)

# Anualidad Geométrica

annuity.geo(pv=NA,fv=100,n=10,p=9,k=.02,i=NA,ic=2,pf=.5,plot=TRUE)
annuity.geo(pv=NA,fv=128,n=5,p=NA,k=.04,i=.03,pf=2)

```

```

# Nivel de anualidad

annuity.level(pv=NA, fv=101.85, n=10, pmt=8, i=NA, ic=1, pf=1, imm=TRUE)
annuity.level(pv=80, fv=NA, n=15, pf=2, pmt=NA, i=.01, imm=FALSE)

#####
# X. Perpetuidades
#####

# Perpetuidad Aritmética

perpetuity.arith(100, p=1, q=.5, i=NA, ic=1, pf=1, imm=TRUE)
perpetuity.arith(pv=NA, p=1, q=.5, i=.07, ic=1, pf=1, imm=TRUE)
perpetuity.arith(pv=100, p=NA, q=1, i=.05, ic=.5, pf=1, imm=FALSE)

# Perpetuidad Geométrica

perpetuity.geo(pv=NA, p=5, k=.03, i=.04, ic=1, pf=1, imm=TRUE)
perpetuity.geo(pv=1000, p=5, k=NA, i=.04, ic=1, pf=1, imm=FALSE)

# Nivel de perpetuidad

perpetuity.level(pv=100, pmt=NA, i=.05, ic=1, pf=2, imm=TRUE)
perpetuity.level(pv=100, pmt=NA, i=.05, ic=1, pf=2, imm=FALSE)

#Intercambio de tasa de interés

swap.rate(rates=c(.04, .05, .06), type = "spot_rate")
swap.rate(rates=c(.93, .95, .98, .90), type = "zcb_price")

# Intercambio de productos

swap.commodity(prices=c(103,106,108), rates=c(.04, .05, .06))
swap.commodity(prices=c(103,106,108),
rates=c(.9615, .907, .8396), type="zcb_price")
swap.commodity(prices=c(105,105,105),
rates=c(.85, .89, .80), type="zcb_price")

#####
# XII. Precios de acciones
#####

# Bear Call Spread

bear.call(S=100, K1=70, K2=130, r=.03, t=1, price1=20, price2=10, plot=TRUE)

# Bear Call Spread - Black Scholes

bear.call.bls(S=100, K1=70, K2=130, r=.03, t=1, sd=.2, plot=T)

# Bull Call Spread

bull.call(S=115, K1=100, K2=145, r=.03, t=1, price1=20, price2=10, plot=TRUE)

```

```

bull.call.bls (S=115,K1=100,K2=145,r=.03,t=1,sd=.2

# Butter???y Spread

butterfly.spread (S=100,K1=75,K2=100,K3=125,r=.03,t=1,price1=25,price2=10,
price3=5,plot=T)
butterfly.spread.bls (S=100,K1=75,K2=100,K3=125,r=.03,t=1,sd=.2,plot=T)

# Collar Strategy

collar (S=100,K1=90,K2=110,r=.05,t=1,price1=5,price2=15,plot=TRUE)

# Covered Call

covered.call (S=100,K=110,r=.03,t=1,sd=.2,plot=TRUE)

# Covered Put

covered.put (S=100,K=110,r=.03,t=1,sd=.2,plot=TRUE)

# Call Option

option.call (S=100,K=110,r=.03,t=1.5,sd=.2,price=NA,position="short")
option.call (S=100,K=100,r=.03,t=1,sd=.2,price=10,position="long")

# Put Option

option.put (S=100,K=110,r=.03,t=1,sd=.2,price=NA,position="short")
option.put (S=100,K=110,r=.03,t=1,sd=.2,price=NA,position="long")

# Protective Put

protective.put (S=100,K=100,r=.03,t=1,sd=.2)
protective.put (S=100,K=90,r=.01,t=.5,sd=.1)

#=====  

# XIII. Contratos Forward  

#=====  

# Contrato Forward

forward (S=100,t=2,r=.03,position="short",div.structure="none")
forward (S=100,t=2,r=.03,position="long",div.structure="discrete",dividend
=3,k=.02)
forward (S=100,t=1,r=.03,position="long",div.structure="continuous",D=.01)

# Contrato prepago Forward

forward.prepaid (S=100,t=2,r=.04,position="short",div.structure="none")
forward.prepaid (S=100,t=2,r=.03,position="long",div.structure="discrete",
dividend=3,k=.02,df=2)
forward.prepaid (S=100,t=1,r=.05,position="long",div.structure="continuous
",D=.06)

```

```
#=====
=====#
```

```
##### Fin sesion 4
#####}
```

```
#=====
=====#
```