

Factorizacion de Cholesky

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```
Cholesky <- function(A){
  n <- nrow(A)

  L <- matrix(rep(0, times = n^2), nrow = n, ncol = n, byrow = TRUE)

  # Paso 1 -----
  L[1,1] <- sqrt(A[1,1])

  # Paso 2 -----
  for (j in 2:n){
    L[j,1] <- A[j,1]/L[1,1]
  }

  # Paso 3 -----
  for (i in 2:(n-1)) {
    # Paso 4 -----
    suma <- 0
    for (k in 1:(i-1)) {
      suma <- suma + L[i,k]^2
    }

    L[i,i] <- sqrt(A[i,i] - suma)

    # Paso 5 -----
    for (j in (i+1):n) {
      suma <- 0
      for (k in 1:(i-1)) {
        suma <- suma + L[j,k]*L[i,k]
      }

      L[j,i] <- (A[j,i] - suma)/L[i,i]
    }
  }

  # Paso 6 -----
  suma <- 0
  for (k in 1:(n-1)) {
    suma <- suma + L[n,k]^2
  }
```

```

L[n,n] <- sqrt(A[n,n]-suma)

return(L)

}
A <- matrix(c(2, -1, 0,
              -1, 2, -1,
              0, -1, 2), nrow = 3, ncol = 3, byrow = TRUE)
test <- Cholesky(A)
print(test)

```

```

##           [,1]      [,2]      [,3]
## [1,]  1.4142136  0.0000000  0.0000000
## [2,] -0.7071068  1.2247449  0.0000000
## [3,]  0.0000000 -0.8164966  1.154701

```

```

print(test%*%t(test))

```

```

##      [,1] [,2] [,3]
## [1,]   2  -1   0
## [2,]  -1   2  -1
## [3,]   0  -1   2

```