**Useful matrix functions in R**

In the following examples, **A** and **B** are matrices and **x** and **b** are a vectors.

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| **Operator or Function** | **Description** |
| **A \* B** | Element-wise multiplication |
| **A %\*% B** | Matrix multiplication |
| **A %o% B** | Outer product. **AB'** |
| **crossprod(A,B) crossprod(A)** | **A'B** and **A'A** respectively. |
| **t(A)** | Transpose |
| **diag(x)** | Creates diagonal matrix with elements of **x** in the principal diagonal |
| **diag(A)** | Returns a vector containing the elements of the principal diagonal |
| **solve(A, b)** | Returns vector **x** in the equation **b = Ax** (i.e., **A-1b**) |
| **solve(A)** | Inverse of **A** where A is a square matrix. |
| **y<-eigen(A)** | **y$val** are the eigenvalues of **A** **y$vec** are the eigenvectors of **A** |
| **cbind(A,B,...)** | Combine matrices(vectors) horizontally. Returns a matrix. |
| **rbind(A,B,...)** | Combine matrices(vectors) vertically. Returns a matrix. |
| **rowMeans(A)** | Returns vector of row means. |
| **rowSums(A)** | Returns vector of row sums. |
| **colMeans(A)** | Returns vector of column means. |
| **colSums(A)** | Returns vector of column sums. |