UNIVERSIDAD DE CÓRDOBA
comprometida con el desarrollo regional

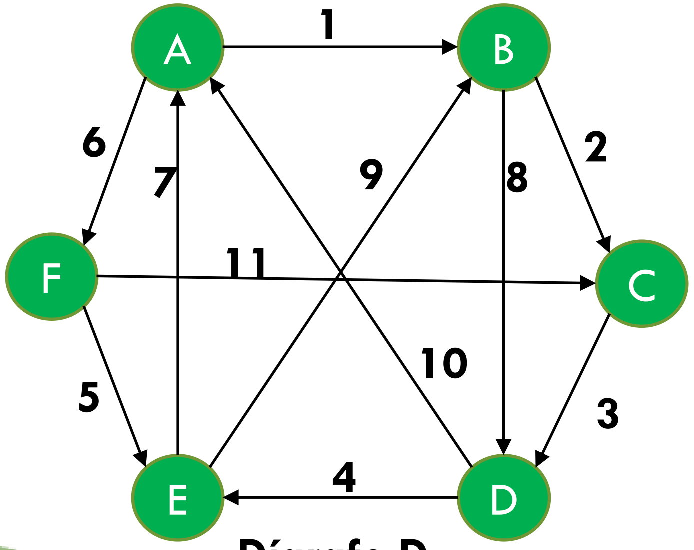
TEORIA DE GRAFOS

UNIDAD 4. SUBDIGRAFO

SUBDIGRAFOS

Definición: Se dice que un dígrafo simple D1 es un **subdigrafo** de un dígrafo D si y sólo si, cada vértice en D1 es también un vértice en D, asigna a cada arista de D1 un par ordenado de vértices de D1.

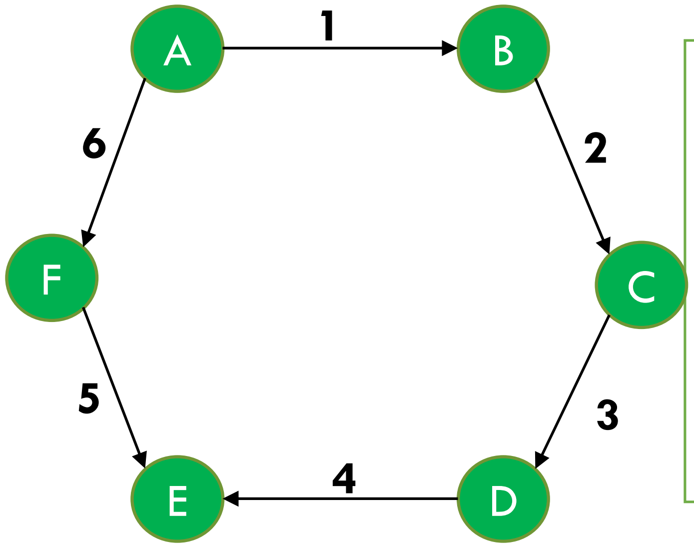
Ejemplo:



Dígrafo D

D = (V, A, f)
D(V) = {A, B, C, D, E, F}
D(A) = {1,2,3,4,5,6,7,8,9,10,11}

$$F_D = \left\{ \begin{array}{l} f_D(1) = (A, B),\ f_D(2) = (B, C), \\ f_D(3) = (C, D),\ f_D(4) = (D, E), \\ f_D(5) = (F, E),\ f_D(6) = (A, F), \\ f_D(7) = (E, A),\ f_D(8) = (B, D), \\ f_D(9) = (E, B),\ f_D(10) = (D, A), \\ f_D(11) = (F, C) \end{array} \right.$$



Subdígrafo D1

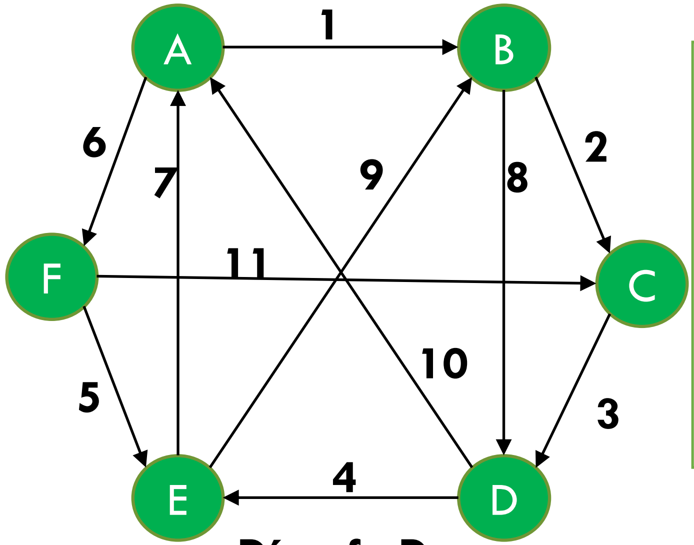
D = (V, A, f)
D(V) = {A, B, C, D, E, F}
D(A) = {1,2,3,4,5,6}

$$F_D = \left\{ \begin{array}{l} f_D(1) = (A, B),\ f_D(2) = (B, C), \\ f_D(3) = (C, D),\ f_D(4) = (D, E), \\ f_D(5) = (F, E),\ f_D(6) = (A, F), \end{array} \right.$$

SUBDIGRAFO COBERTOR

Definición: Un subdigrafo D1 de un dígrafo D se llama **cobertor** si contiene a todos los vértices de D (V(D1) = V(D)).

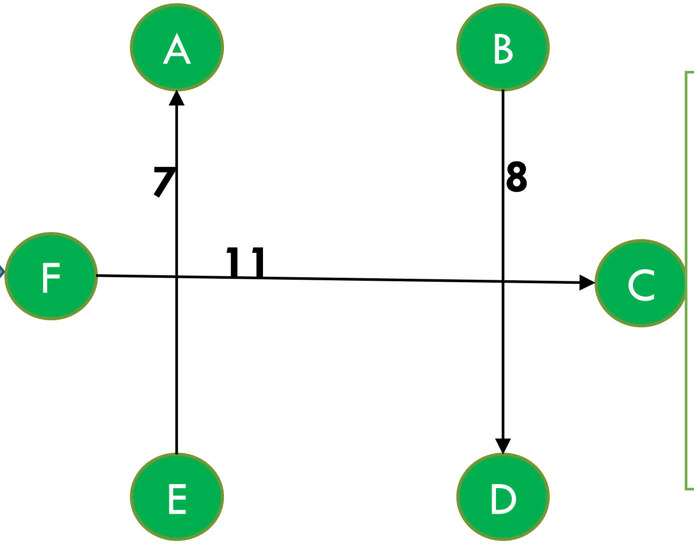
Ejemplo:



Dígrafo D

D = (V, A, f)
D(V) = {A, B, C, D, E, F}
D(A) = {1,2,3,4,5,6,7,8,9,10,11}

$F_D = \begin{cases} f_D(1) = (A, B),\ f_D(2) = (B, C), \\ f_D(3) = (C, D),\ f_D(4) = (D, E), \\ f_D(5) = (F, E),\ f_D(6) = (A, F), \\ f_D(7) = (E, A),\ f_D(8) = (B, D), \\ f_D(9) = (E, B),\ f_D(10) = (D, A), \\ f_D(11) = (F, C) \end{cases}$



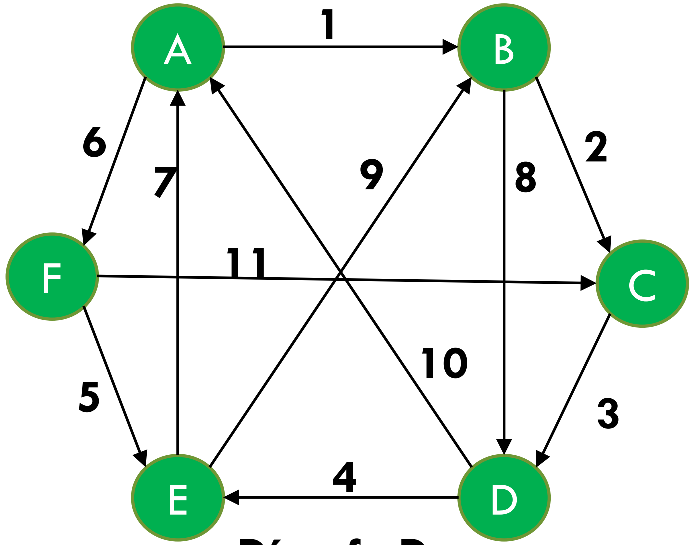
D = (V, A, f)
D(V) = {A, B, C, D, E, F}
D(A) = {7,8,10,11}

$F_D = \begin{cases} f_D(7) = (E, A),\ f_D(8) = (B, D), \\ f_D(10) = (D, A),\ f_D(11) = (F, C) \end{cases}$

Subdígrafo Cobertor D2

VÉRTICES-DISYUNTOS

Definición: Dos subdígrafos D1 y D2 de un dígrafo D son **VÉRTICES-DISYUNTOS,** si no poseen vértices comunes ($V(D1) \cap V(D2) = 0$).



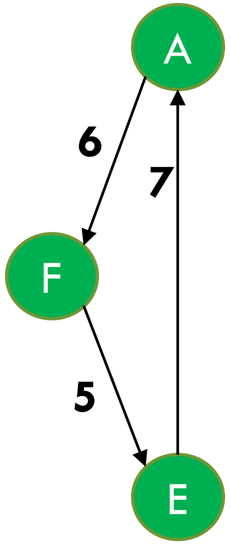
Dígrafo D

$D = (V, A, f)$
$D(V) = \{A, B, C, D, E, F\}$
$D(A) = \{1,2,3,4,5,6,7,8,9,10,11\}$

$$F_D = \left\{ \begin{array}{l} f_D(1) = (A, B),\ f_D(2) = (B, C), \\ f_D(3) = (C, D),\ f_D(4) = (D, E), \\ f_D(5) = (F, E),\ f_D(6) = (A, F), \\ f_D(7) = (E, A),\ f_D(8) = (B, D), \\ f_D(9) = (E, B),\ f_D(10) = (D, A), \\ f_D(11) = (F, C) \end{array} \right.$$

VÉRTICES-DISYUNTOS

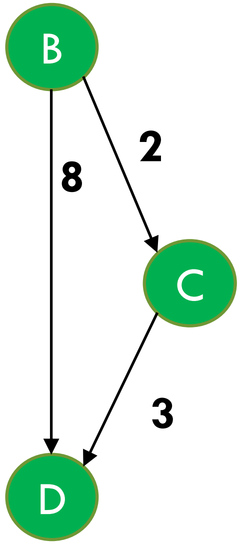
Ejemplo: El subdígrafo D4 es vértice-disyunto del subdígrafo D5



D4

D = (V, A, f)
D(V) = {A, F, E}
D(A) = {5, 6, 7}

$$F_D = \left| \begin{array}{l} f_D(5) = (F, E),\ f_D(6) = (A, F), \\ f_D(7) = (E, A) \end{array} \right.$$



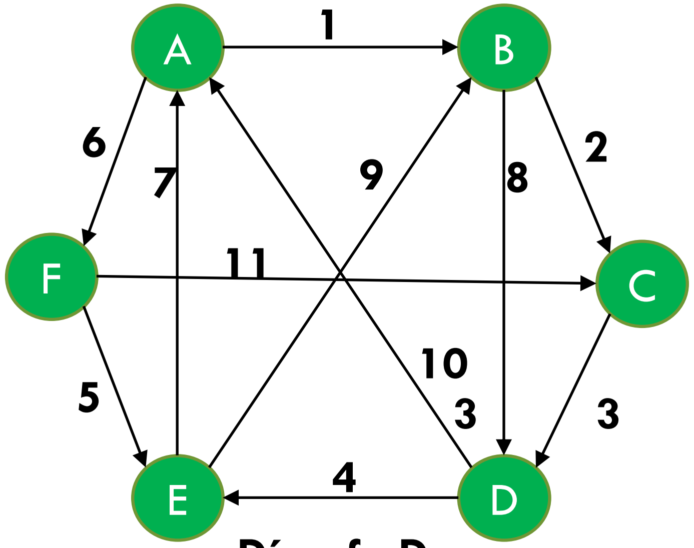
D5

D = (V, A, f)
D(V) = {B, C, D}
D(A) = {2, 3, 8}

$$F_D = \left| \begin{array}{l} f_D(2) = (B, C),\ f_D(3) = (C, D), \\ f_D(8) = (B, D) \end{array} \right.$$

ARISTAS-DISYUNTOS

Definición: Dos subdígrafos D1 y D2 de un dígrafo D son **ARISTAS-DISYUNTOS,** si no poseen aristas en común (A(D1) ∩ A(D2) = 0).



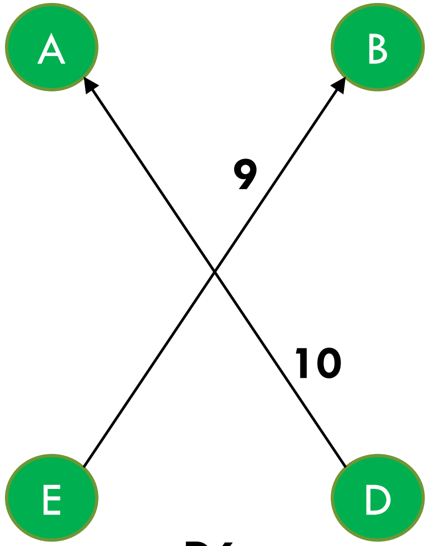
Dígrafo D

D = (V, A, f)
D(V) = {A, B, C, D, E, F}
D(A) = {1,2,3,4,5,6,7,8,9,10,11}

$$F_D = \begin{cases} f_D(1) = (A, B),\ f_D(2) = (B, C), \\ f_D(3) = (C, D),\ f_D(4) = (D, E), \\ f_D(5) = (F, E),\ f_D(6) = (A, F), \\ f_D(7) = (E, A),\ f_D(8) = (B, D), \\ f_D(9) = (E, B),\ f_D(10) = (D, A), \\ f_D(11) = (F, C) \end{cases}$$

ARISTAS-DISYUNTOS

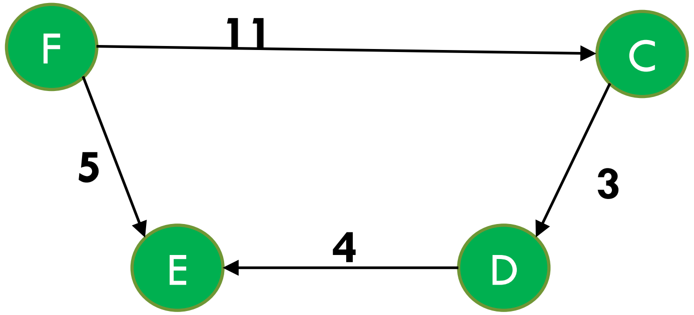
Ejemplo: Los subdígrafos D6 y D7 son aristas-disyuntas ya que no tienen aristas en comunes



D6

$D = (V, A, f)$
$D(V) = \{A. B, D, E\}$
$D(A) = \{9, 10\}$

$F_D = \left[f_D(9) = (E, B),\ f_D(10) = (D, A) \right.$



D7

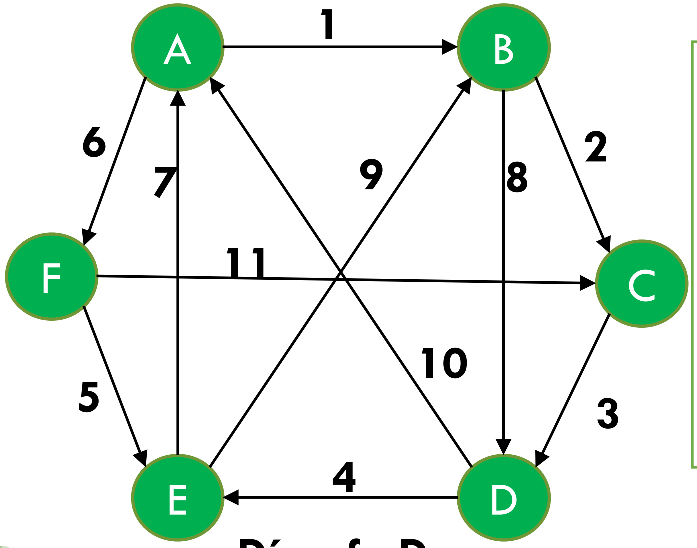
$D = (V, A, f)$
$D(V) = \{F, C, D, E\}$
$D(A) = \{11, 3, 4, 5\}$

$F_D = \left[\begin{array}{l} f_D(11) = (F, C),\ f_D(3) = (C, D) \\ f_D(4) = (D, E),\ f_D(5) = (F, E) \end{array} \right.$

RESTANTE AL SUPRIMIR UN CONJUNTO DE VÉRTICES

Definición: Sea D un dígrafo con |V| ≥ 2 y sea v’ ∈ V, la operación supresión de V ’ consiste en suprimir de D los vértices de V ’ y las aristas incidentes en ellos. Se denota D – {V ’}.

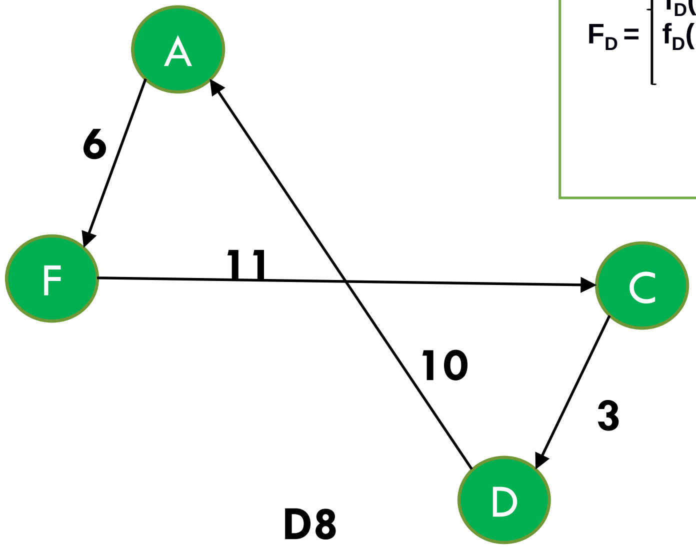
Ejemplo: D – {B, E}



Dígrafo D

D = (V, A, f)
D(V) = {A, B, C, D, E, F}
D(A) = {1,2,3,4,5,6,7,8,9,10,11}

$F_D = \begin{cases} f_D(1) = (A, B), f_D(2) = (B, C), \\ f_D(3) = (C, D), f_D(4) = (D, E), \\ f_D(5) = (F, E),\ f_D(6) = (A, F), \\ f_D(7) = (E, A), f_D(8) = (B, D), \\ f_D(9) = (E, B), f_D(10) = (D, A), \\ f_D(11) = (F, C) \end{cases}$



D8

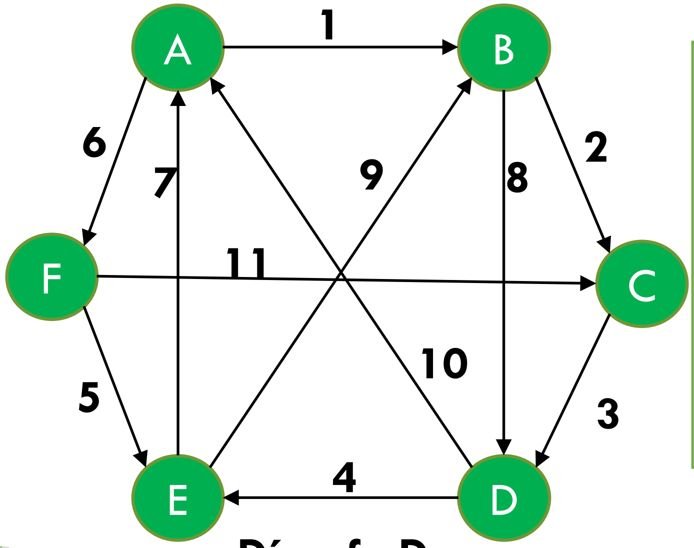
D = (V, A, f)
D(V) = {A, C, D, F}
D(A) = {6, 11, 10, 3}

$F_D = \begin{cases} f_D(6) = (A, F), f_D(11) = (F, C) \\ f_D(10) = (D, A), f_D(3) = (C, D) \end{cases}$

RESTANTE AL SUPRIMIR UN CONJUNTO DE ARISTAS

Definición: Sea D un dígrafo, sea A1 ≠ 0 Y A1 ≤ A. se llama subdigrafo restante al suprimir A1, al subdígrafo obtenido al suprimir de A las aristas de A1. se denota por D –{A1}

Ejemplo: D – {7, 8, 11}



Dígrafo D

D = (V, A, f)
D(V) = {A, B, C, D, E, F}
D(A) = {1,2,3,4,5,6,7,8,9,10,11}

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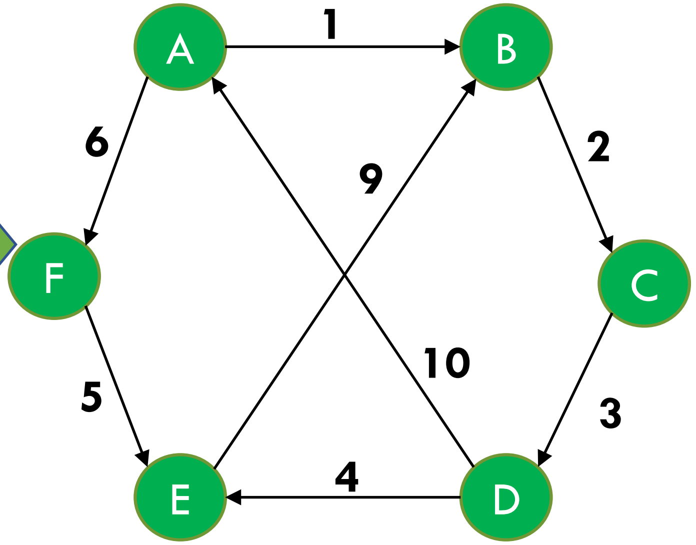

D9

D = (V, A, f)
D(V) = {A, B, C, D, E, F}
D(A) = {1,2,3,4,5,6,9,10}

$F_D = \begin{cases} f_D(1) = (A, B),\ f_D(2) = (B, C), \\ f_D(3) = (C, D),\ f_D(4) = (D, E), \\ f_D(5) = (F, E),\ f_D(6) = (A, F), \\ f_D(9) = (E, B),\ f_D(10) = (D, A), \end{cases}$