Recall: Strategy $a_i' \in A_i$ is strictly dominated by $a_i^+ \in A_i$ iff f.a. $a_{-i} \in A_{-i}$:

$$u_i(a_{-i}, a_i^+) > u_i(a_{-i}, a_i').$$

(IEDS)

Algorithm: Iterated elimination of dom. strat.

1. If possible, eliminate a dominated strategy of some player (leading to game G'), else terminate.
2. Go to 1.

IEDS can be applied with weak or strong dominance.

Example (strong dominance):

2

1

	L	C	R
T	2, 0	1, 1	4, 2
M	1, 4	1, 1	2, 3
B	1, 3	0, 2	3, 0

NE of orig. game

[3] dom by T

[1] strictly dom. by T

[4] dom. by R

[2] strictly dom by R

Example (with weak dominance)

	L	R
T	2,1	0,0
M	2,1	1,1
B	0,0	1,1

[1] (M)

[2] (L)

	L	R
T	2,1	0,0
M	2,1	1,1
B	0,0	1,1

[2] (M)

[1] (T)

	L	R
T	2,1	0,0
M	2,1	1,1
B	0,0	1,1

[1] (M)

[2] (R)

two remaining solutions, both with payoff profile (2,1)

<u>Remark:</u> Result of IEDS with weak dominance is not unique (neither in terms of remaining action profiles nor of remaining payoff profiles.)

<u>Lemma:</u> Let G be a strategic game and G' be the game resulting from eliminating <u>one</u> strictly dominated strategy from G. Then the NEs of G are exactly those of G'.

<u>Proof:</u> Let a_i' be the eliminated strategy.

Then ex. a_i^+ s.t. f.a. $a_{-i} \in A_{-i}$:

$$u_i(a_{-i}, a_i') < u_i(a_{-i}, a_i^+) \qquad (1)$$

„$\Rightarrow$": Let a^* be an NE of G. Then

$$u_i(a_{-i}^*, a_i^*) \geq u_i(a_{-i}^*, a_i'') \quad \text{f.a. } a_i'' \in A_i$$

$$\Rightarrow u_i(a_{-i}^*, a_i^*) \geq u_i(a_{-i}^*, a_i^+) \overset{(1)}{>} u_i(a_{-i}^*, a_i')$$

$\Rightarrow a_i^* \neq a_i'$ $\Rightarrow$ NE strategy was not eliminated

$\Rightarrow a^*$ still NE in G'.

"$\Leftarrow$": Let a^* be a NE G'. Then:

- For players $j \neq i$: $a_j^* \in B'(a_{-j}^*) = B(a_{-j}^*)$

(no strategy of player j was eliminated.)

For player i: $u_i(a_{-i}^*, a_i^*) \geq u_i(a_{-i}^*, a_i^+)$

a^* NE in G', a_i^+ in G'!

$$\overset{(1)}{>} u_i(a_{-i}^*, a_i')$$

$\Rightarrow$ a_i' no better response to a_{-i}^* than a_i^* (in G)

$\Rightarrow$ $a_i^* \in B(a_{-i}^*)$ $\Rightarrow$ a^* also NE in G.

$\square$

<u>Corollary:</u> If IEDS with strict dominance results in a <u>unique</u> strategy profile a^*, then a^* is the unique NE of orig. game G.

<u>Pro.:</u> Inductive application of previous lemma.

<u>Remark:</u> IEDS with strict dominance does not depend on elimination order.