

PMSS DIDA

Roberto Verdone
www.robertoverdone.org

roberto.verdone@unibo.it
+39 051 20 93817

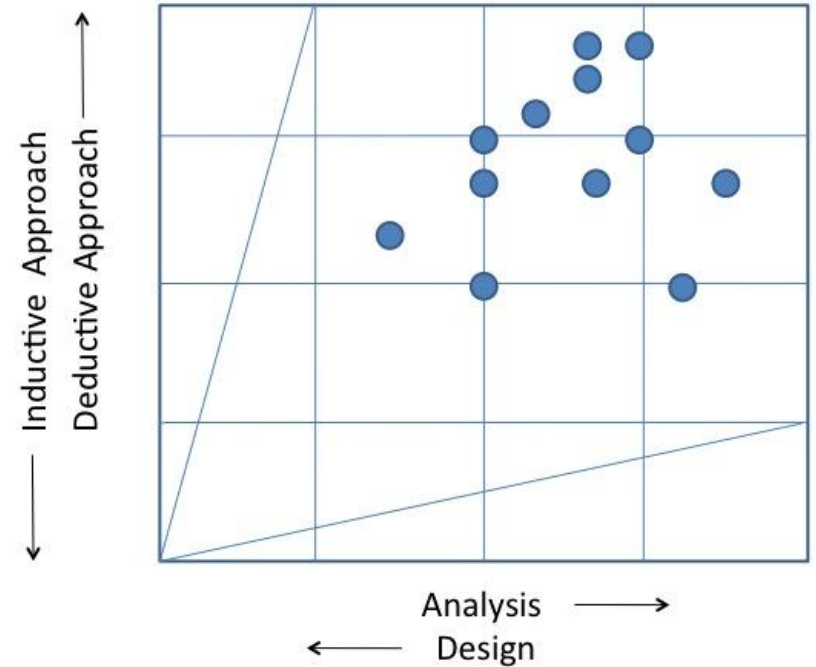
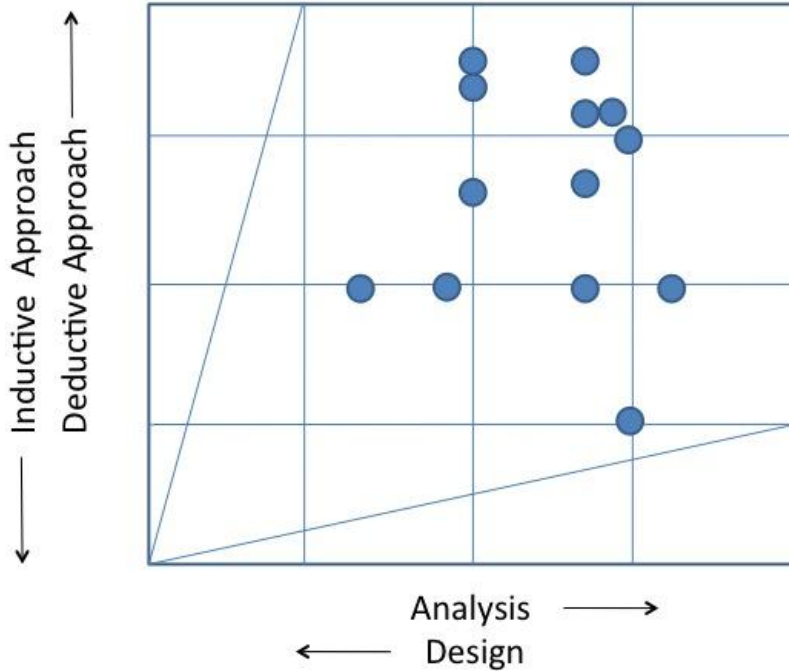
Office Hours:
Monday 4 – 6 pm

A.Y. 2016-17
Credits: 3

DIDA

Deduction and Induction

Design and Analysis



Deduction and Induction

Deduction

The logical process that, starting from a given statement, applies it to specific cases.

The statement is an *assumption*, of axiomatic nature.

The conclusion is certain.

Induction

The logical process that, starting from premises, determines a general rule.

The premises are probabilistically correct (*suppositions*).

The conclusion might be wrong.

Deduction and Induction

Example: sequence of numbers

$[x_n] = 1, 2, 3, 5, 8, ?$

Deduction and Induction

Example: sequence of numbers

$[x_n] = 1, 2, 3, 5, 8, 13$

induction

a) $x_1 = 1, x_2 = 2$

b) $x_n = x_{n-1} + x_{n-2}$ whatever $n > 2$

$\rightarrow [x_n] = 1, 2, 3, 5, 8, 13$

deduction

Deduction and Induction

Example / 2: received power at d meters from GSM base station

Pr [dBm] =

- 1.5 at 10 m,
- 7.6 at 20 m,
- 15.5 at 50 m,
- ? at 100 m

induction

a) $P_t = 10$ W, $G_t = 10$, $G_r = 1$, $\lambda = 0,33$ m

b) Pr [dBm] = $10 \cdot \text{Log}_{10}(P_t [\text{mW}] \cdot G_t \cdot G_r \cdot (\lambda/4\pi d)^2) =$

= - 21.5 at 100 m

deduction

Abduction

The logical process that, starting from a given statement, adding some observations, derives conclusions

The statement is an *assumption*.

Observations are probabilistically correct (*suppositions*).

The conclusion might be wrong.

Abduction

The logical process that, starting from a given statement, adding some observations, derives conclusions

The statement is an *assumption*.

Observations are probabilistically correct (*suppositions*).

The conclusion might be wrong.

Example / 3:

a) $P_t = 10 \text{ W}$, $G_t = 10$, $\lambda = 0,33 \text{ m}$, *the receive antenna is a dipole*

b) $P_r [\text{dBm}] = 10 \cdot \text{Log}_{10}(P_t [\text{mW}] \cdot G_t \cdot G_r \cdot (\lambda / 4\pi d)^2)$

→ Supposing that $G_r = 1$ then $P_r [\text{dBm}] = - 21.5$ at 100 m

Deduction and Induction in Engineering

Equally relevant.

How to measure your attitude?

Design and Analysis

Design (Synthesis)

The process that assembles components to achieve a product.

Analysis

The process that decomposes a system into subsystems.

Design and Analysis in Engineering

Relevant according to the job role.

**Design skills are relevant for
line managers, software engineers, etc.**

**Analytical skills are relevant for
system or project managers, etc.**

How to measure your attitude?

DIDA in Engineering

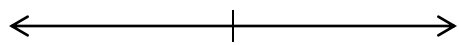
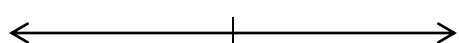
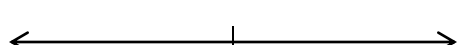

How to measure your attitude?

Test yourself through the Index of Learning Styles (ILS) at:

<http://www.engr.ncsu.edu/learningstyles/ilsweb.html>

Description of the styles and hints:

<http://www4.ncsu.edu/unity/lockers/users/f/felder/public/ILSdir/styles.htm>

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|------------------|-----------|--|-----------|-------------------|
| VERBAL | 11 |  | 11 | VISUAL |
| GLOBAL | 11 |  | 11 | SEQUENTIAL |
| ACTIVE | 11 |  | 11 | REFLECTIVE |
| INTUITIVE | 11 |  | 11 | SENSING |

DIDA in Engineering

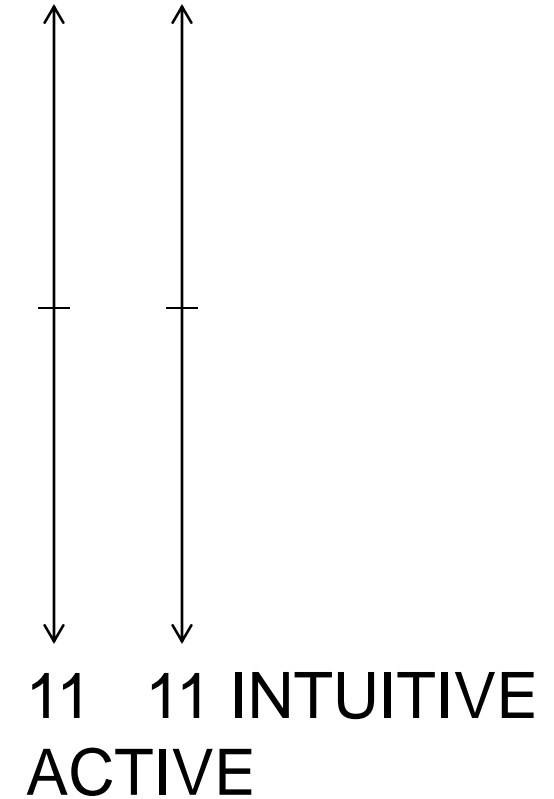
Deductive

SEQUENTIAL 11

REFLECTIVE
11 11 SENSING

Inductive

11 GLOBAL

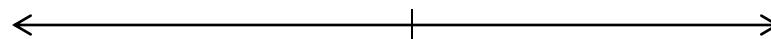


Design

Analysis

11 11 INTUITIVE
ACTIVE

VERBAL 11



11 VISUAL

DIDA in Engineering

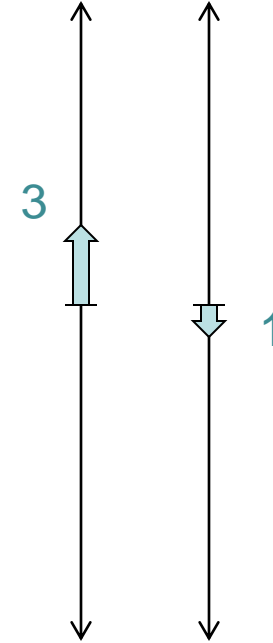
Deductive

SEQUENTIAL 11

REFLECTIVE
11 11 SENSING

Inductive

11 GLOBAL



Design

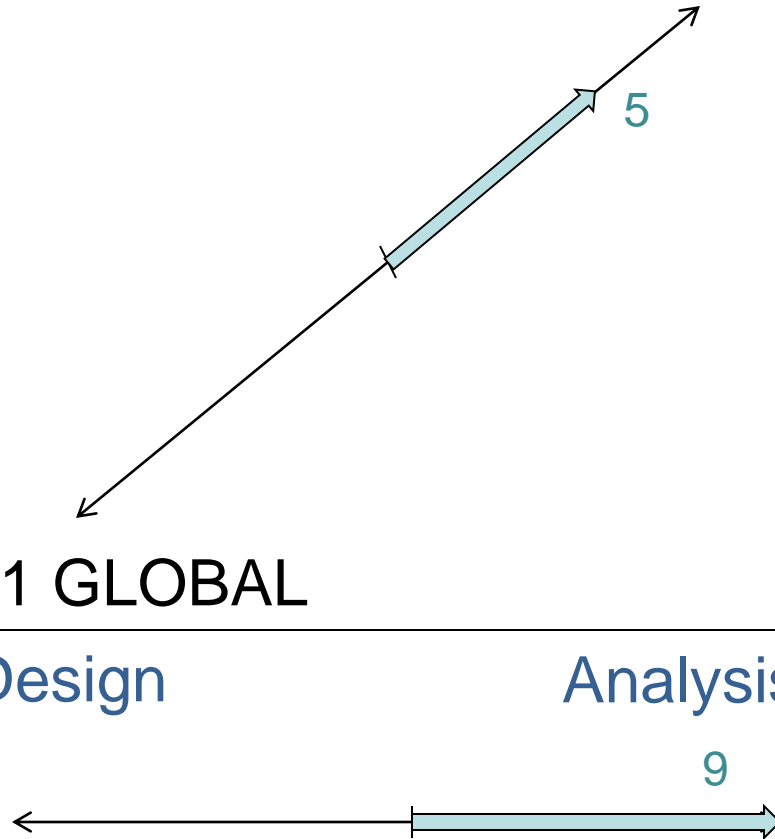
Analysis

11 11 INTUITIVE
ACTIVE

VERBAL 11

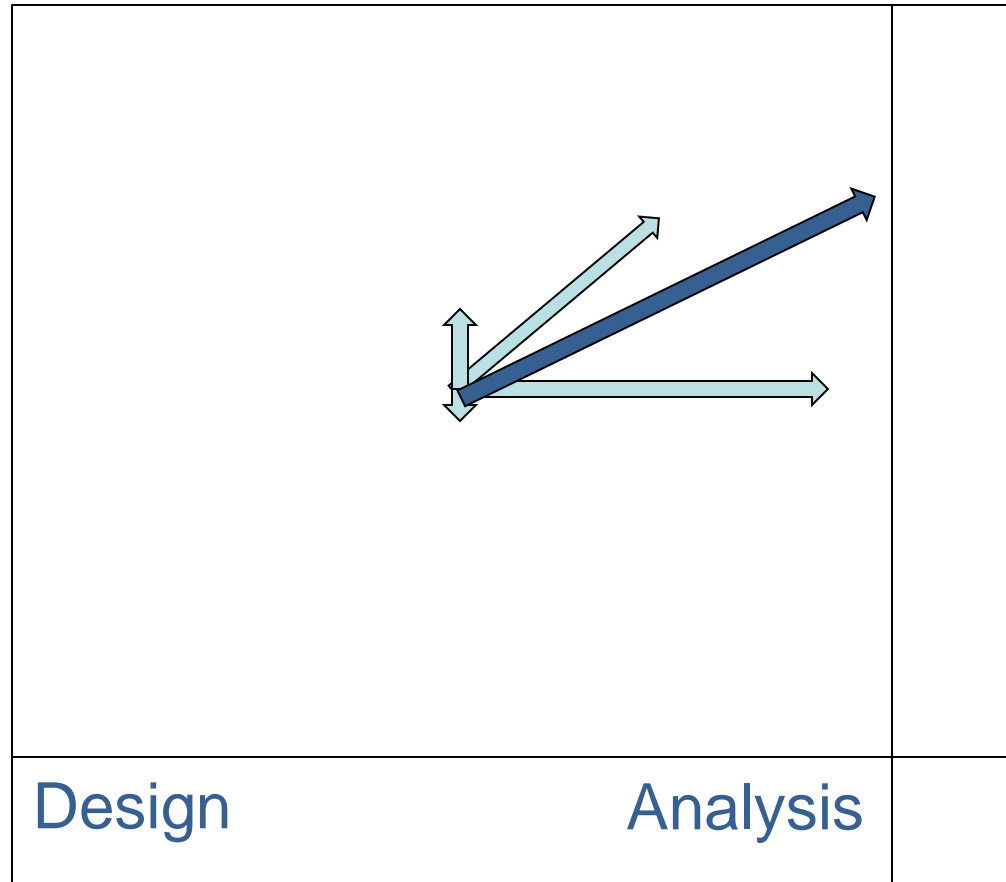
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11 VISUAL



DIDA in Engineering

Deductive



Inductive

Design

Analysis