

TRACS: Center for Theoretical Research and its Applications in Computer Science (An Overview)

Faculty:

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Possible Problems: . . .

Our Expertise

Application Areas

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1. Possible Problems: General View

- Intelligent human activity:
 - find the state of the world – *science*
 - make decisions based on this analysis – *business*
 - design new things, new objects, new configurations – *engineering*
- Common problems:
 - uncertainty
 - complexity

Possible Problems: ...

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2. Our Expertise

- Find the state of the world:
 - *data processing*: $y = f(x_1, \dots, x_n)$;
 - *measurement uncertainty*: $\Delta x_i \stackrel{\text{def}}{=} \tilde{x}_i - x_i \neq 0$;
 - *problem*: how Δx_i affects $\Delta y = \tilde{y} - y$;
 - *tools*: traditional statistics, interval computations, etc.
 - *who*: Kreinovich, Ceberio
- Make decisions based on this analysis:
 - *traditional approach*: $M_p(a) \stackrel{\text{def}}{=} \sum p_i \cdot u_i(a) \rightarrow \max$;
 - *uncertainty*: in p_i , in $u_i(a)$
 - *example*: worst-case analysis $M_P(a) = \max_{p \in P} M_p(a)$
 - *general case*: non-linear (“fuzzy”) measures $M_P(a)$
 - *who*: Modave
- Design new things, new objects, new configurations:
 - *general case*: find $x = (x_1, \dots, x_n)$ that satisfies several constraints
 $f_i(x) \geq 0, f_j(x) = 0$
 - *problem*: constraints are “soft”
 - *who*: Ceberio
- Complexity: Longpré

Possible Problems: . . .

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3. Application Areas

- Current Application Areas – with examples:
 - *Geoinformatics*:
 - * eliminating duplicates and outliers in gravity databases
 - *Structural Integrity of Aerospace Structures*:
 - * detecting and locating faults
 - *Security and Privacy*:
 - * maintaining privacy in a statistical database
- Developing Application Areas:
 - Bioinformatics
 - Transportation
 - ?

Possible Problems: . . .

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