

# ADIOS<sub>3</sub>

## Challenges, Opportunities, and Uncertainty Assessment

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**National Institute of Standards and Technology**

# ADIOS<sub>3</sub> Project Proposal

## CHALLENGES & OPPORTUNITIES

### GNOME-ADIOS COUPLING

- Forecasting marine spill evolution analogous to atmospheric **transport** of greenhouse gases and associated chemical kinetics

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- **Assimilate** observations made during and after spill
  - To reduce uncertainty about oil fate
  - To increase response effectiveness

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### EULERIAN VS. LAGRANGIAN

- Advantages and disadvantages of Eulerian and Lagrangian approaches for assimilation of measurements
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- Advantages and disadvantages of Eulerian and Lagrangian approaches for assimilation of measurements
  - Made at stations independent of oceanic circulation
  - Made by floaters and drifters
- Exploiting chemical or physical tracers entrained into spilling oil

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## CAPABILITIES

### RESPONDER'S QUESTIONS

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- Where are these going?

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## MODEL OUTPUT

$$y_s(t) = f(x_{\mathcal{N}(s)}(t), x_{\mathcal{N}(s)}(t-1), \dots, \\ y_{\mathcal{N}(s)}(t-1), y_{\mathcal{N}(s)}(t-2), \dots, \alpha)$$

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- $\alpha$ : parameters

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- Model formulated as system of differential or difference equations

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*Assess model uncertainty, and express it in results*

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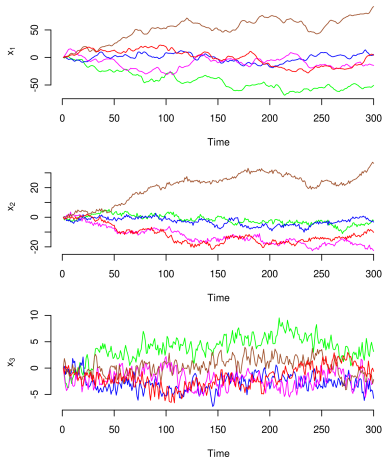
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  - Summarize outcomes: **means**, **standard deviations**, **correlations**, **probability intervals/regions**

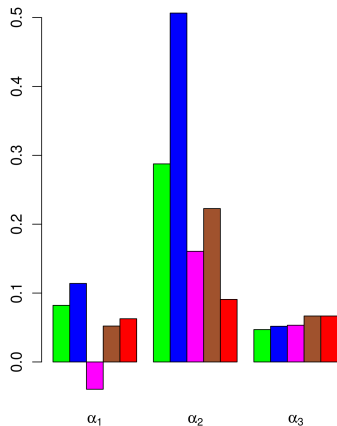
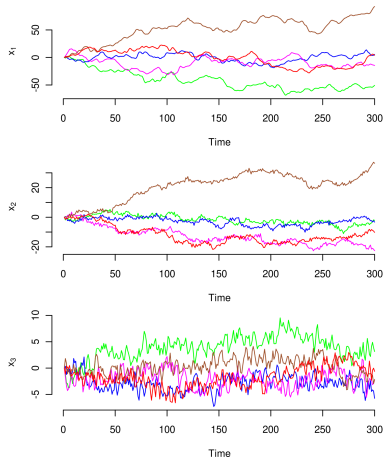
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SCENARIOS FOR MODEL  $y_t = f(x_{1,t}, x_{2,t}, x_{3,t}, \alpha_1, \alpha_2, \alpha_3)$



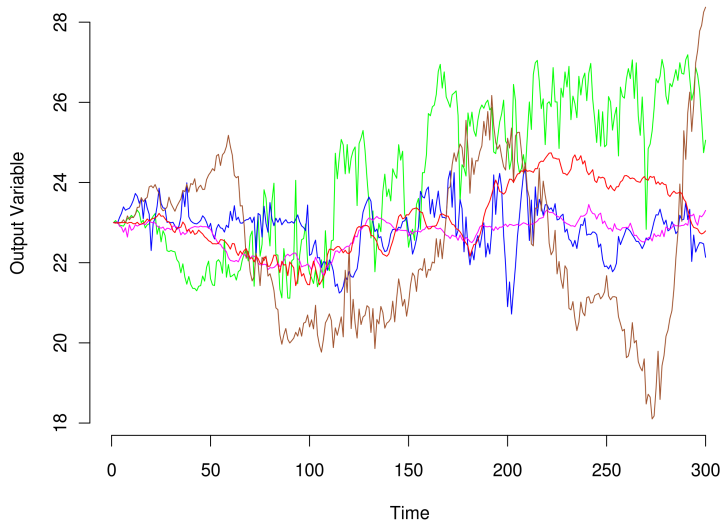
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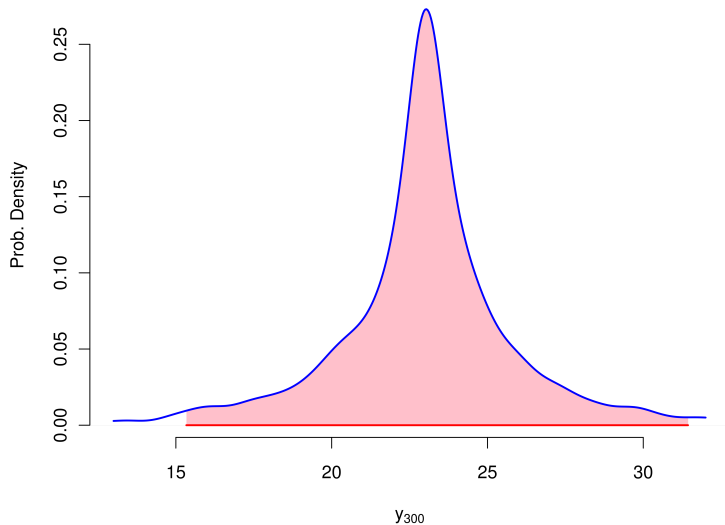
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SCENARIO OUTCOMES —  $y_t = f(x_{1,t}, x_{2,t}, x_{3,t}, \alpha_1, \alpha_2, \alpha_3)$



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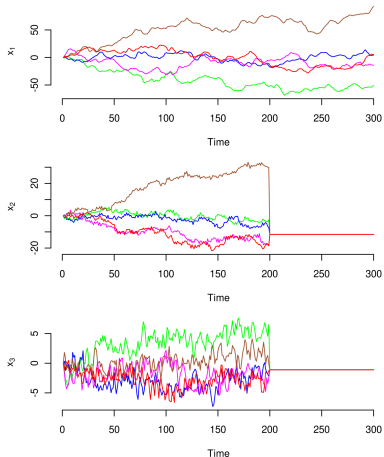
PROBABILITY DISTRIBUTION OF  $y_{300}$





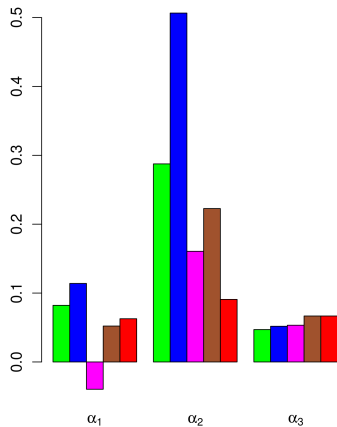
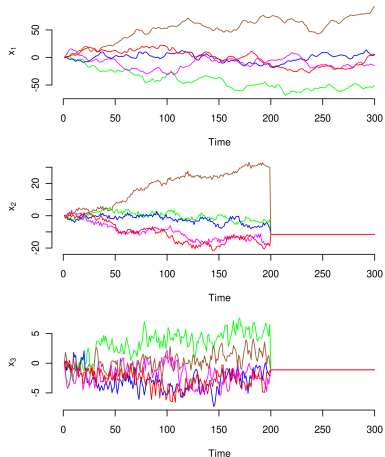
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