# **Structured Electronic Design**

**Operational Amplifiers: types** 

Anton J.M. Montagne

### Universal building block for analog computers: http://www.analogmuseum.org/

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### Analog computing:

- addition
- subtraction
- multiplication (gain)
- integration
- differentiation
- absolute value

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### 1967: Philbrick: EP35AU



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Models EP35AU and PP35AU Differential Operational Amplifiers AU are fully differ Is EP35 AU and P ions are in feedback and controlling, es-nplifier must maintain erent over a very wide tput may be shorted to ground

ons. EP35AU is a plug-i





SPECIFICATIONS

100,000 200,000 1,000,000 40,000

Built-in 10 μV/\*C 2 mV 25 μV 10 μV

#2 nA +20 nA 0.1 nA/\* 45 nA 1 nA 0.1 nA

10 μV 6 pA 10 µV 6 pÅ

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8 kHz ±10 V 5 V 20,000:1

5 MΩ || 5 pH × 10<sup>9</sup>Ω || 27 p × 10<sup>9</sup>Ω || 27 p

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Just have a look at:

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- b. Low equivalent input offset voltage
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- 3. Fully differential operational amplifiers Intended for driving high-frequency, differential-input ADCs
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## 4. Zero-drift operational amplifiers

Complex internal architecture for reduction of input offset

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