

Prekybos simuliavimas

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Turinys

- Kam reikalingas simuliacija?
- Kodėl sunku atkartoti realybę?
- Kokios problemos dažnai atsitinka?
- Kaip jas galima išspręsti?

Tikslas

- Ištestuoti prekybos sistemą greitai ir pigiai
- Bandoma pritraukti kuo arčiau realybės
- Ne visada tai gaunasi arba ...
tai gali kainuoti daug

Problemos

- Negalima tiksliai numatyti praslydimo
- Negalima tiksliai numatyti, ar sandoriai bus pilnai įvykdyti
- Nežinia kaip rinka judėjo viduryje baro
- Greitos simuliacijos būna netikslios
- Tikslios simuliacijos yra lėtos ir brangios
 - Reikia pirkti gerus duomenis

JAV akcijas

Trades and Quotes

Available Dates: 01/02/1993 - 11/01/2010

COMPLETE DATABASE <i>All Symbols Back To Database Inception</i>	\$84,000.00
COMPLETE DATABASE BY YEAR <i>All Symbols For 1 Year</i>	\$14,400.00
COMPLETE DATABASE BY YEAR <i>All Symbols For 2 Years</i>	\$25,200.00
COMPLETE DATABASE BY YEAR <i>All Symbols For 3 Years</i>	\$36,000.00
COMPLETE DATABASE BY YEAR <i>All Symbols For 4 Years</i>	\$43,200.00
COMPLETE DATABASE BY YEAR <i>All Symbols For 5 Years</i>	\$50,400.00
COMPLETE DATABASE BY YEAR <i>Each Additional Year</i>	\$3,600.00
COST PER SYMBOL-YEAR	\$30.00
PICK 100 DISCOUNT <i>Symbol-Year Discount for Purchasing any Combination of 100 Symbol-Years</i>	\$28.00
PICK 250 DISCOUNT <i>Symbol-Year Discount for Purchasing any Combination of 250 Symbol-Years</i>	\$26.00
PICK 500 DISCOUNT <i>Symbol-Year Discount for Purchasing any Combination of 500 Symbol-Years</i>	\$24.00
UPDATES TO COMPLETE DATABASE <i>Daily Updates For One Year</i>	\$14,400.00
UPDATES PER SYMBOL <i>Daily Updates For One Symbol For One Year</i>	\$30.00
MINIMUM ORDER	\$990.00

Trades Only

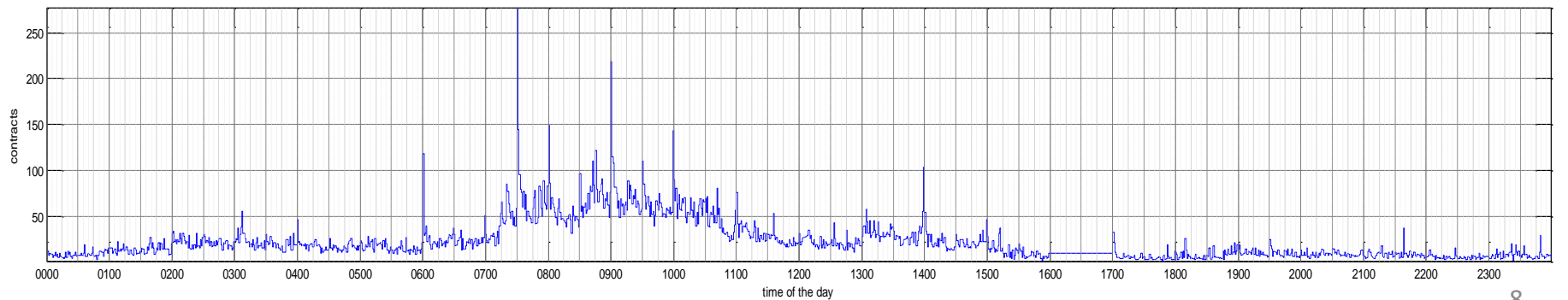
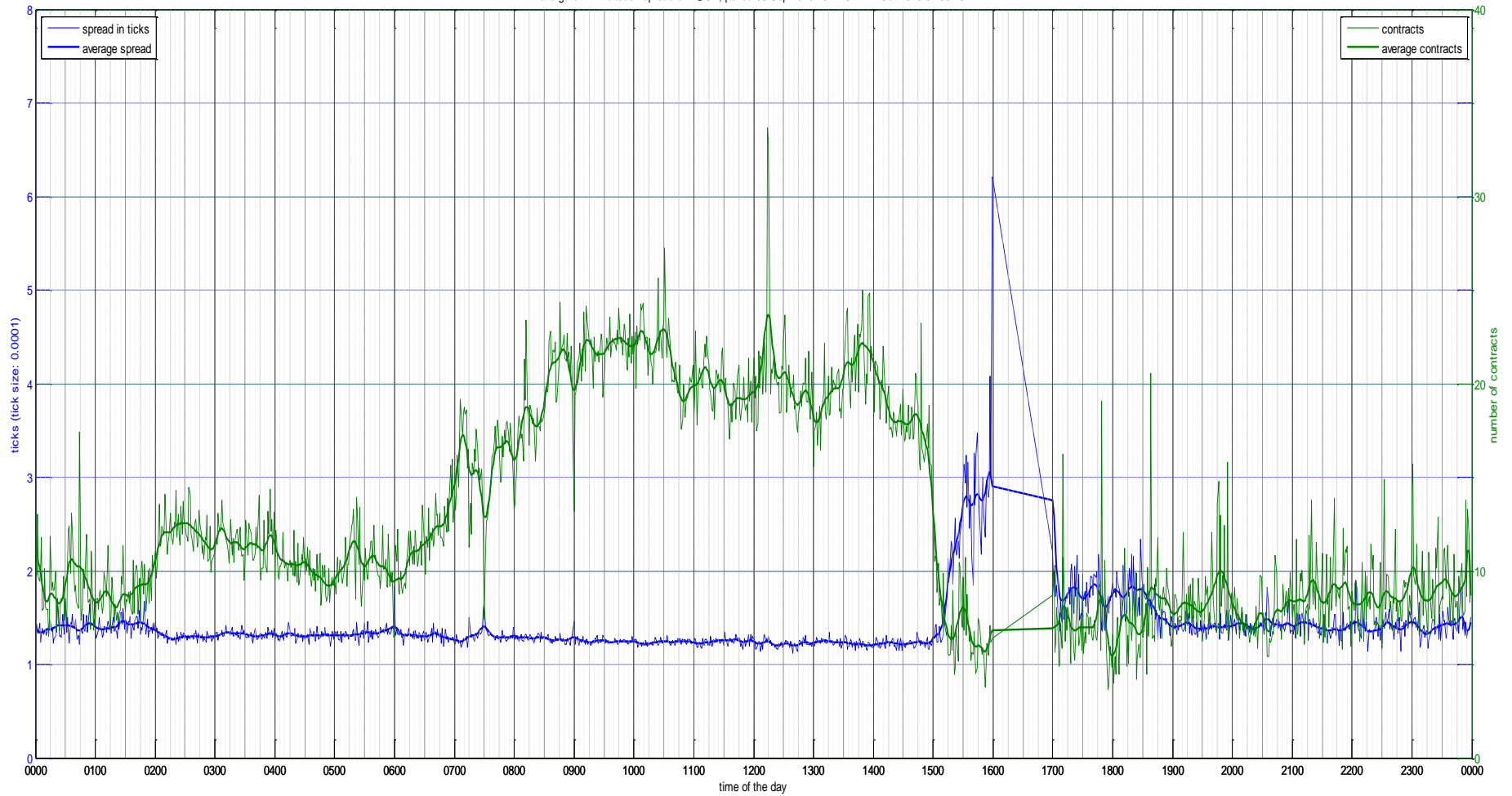
Available Dates: 01/02/1993 - 11/01/2010

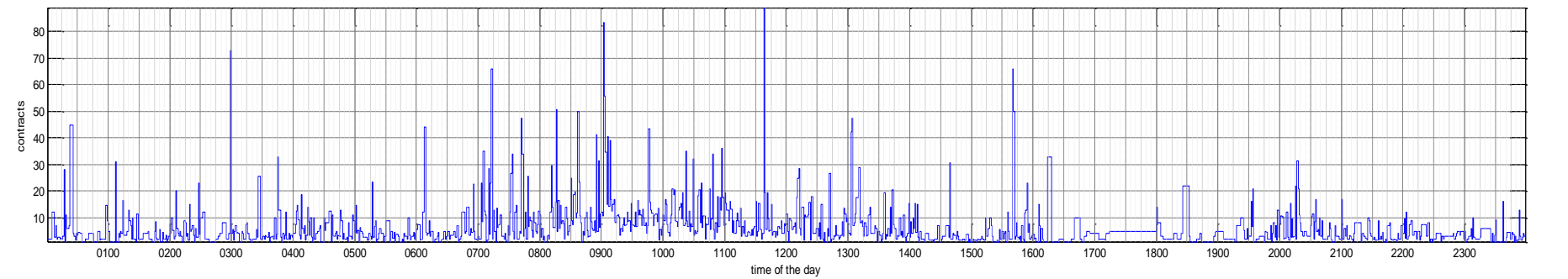
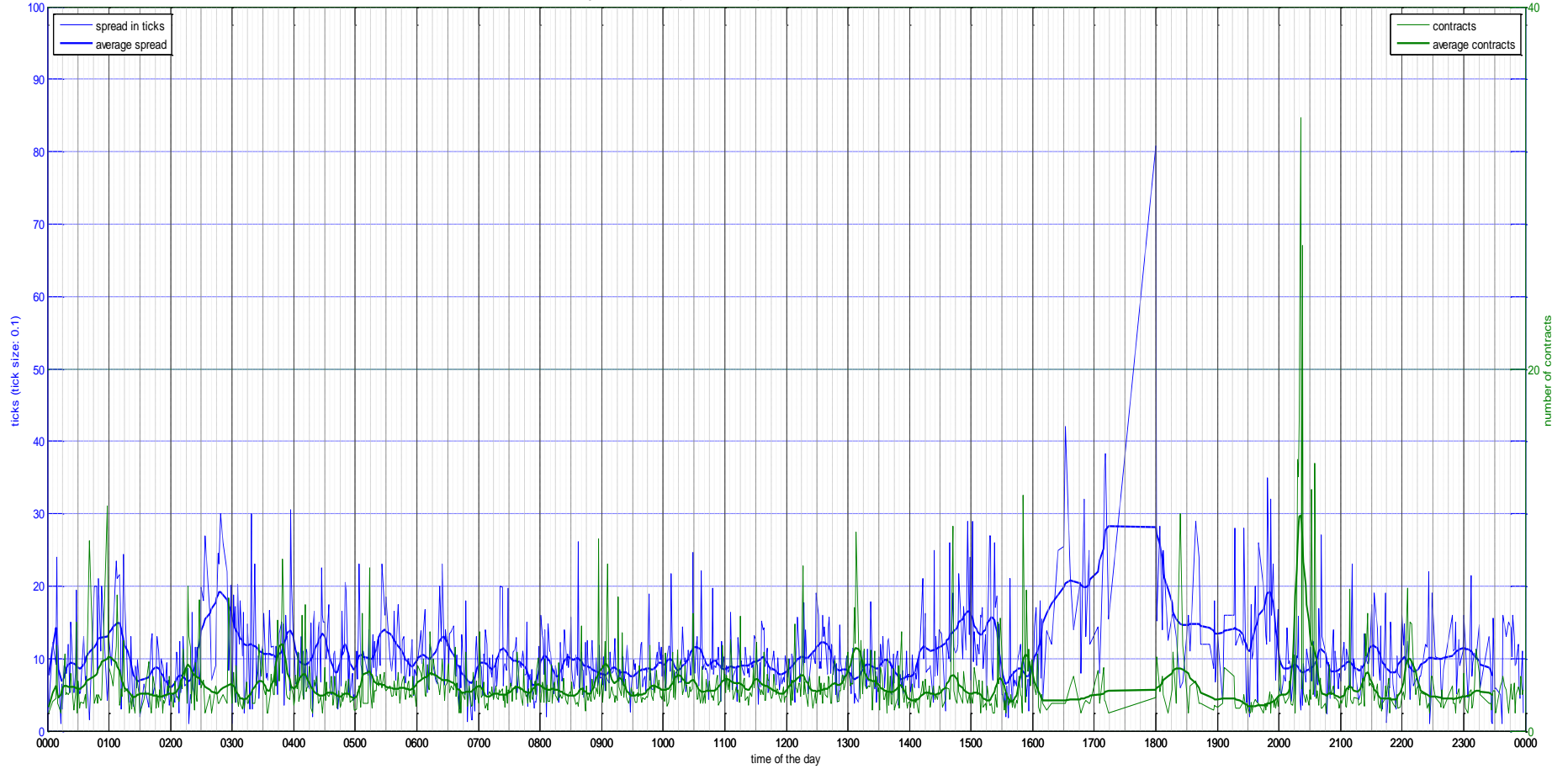
COMPLETE DATABASE <i>All Symbols Back To Database Inception</i>	\$58,500.00
COMPLETE DATABASE BY YEAR <i>All Symbols For 1 Year</i>	\$10,080.00
COMPLETE DATABASE BY YEAR <i>All Symbols For 2 Years</i>	\$17,640.00
COMPLETE DATABASE BY YEAR <i>All Symbols For 3 Years</i>	\$25,200.00
COMPLETE DATABASE BY YEAR <i>All Symbols For 4 Years</i>	\$30,240.00
COMPLETE DATABASE BY YEAR <i>All Symbols For 5 Years</i>	\$35,280.00
COMPLETE DATABASE BY YEAR <i>Each Additional Year</i>	\$2,520.00
COST PER SYMBOL-YEAR	\$20.00
PICK 100 DISCOUNT <i>Symbol-Year Discount for Purchasing any Combination of 100 Symbol-Years</i>	\$19.00
PICK 250 DISCOUNT <i>Symbol-Year Discount for Purchasing any Combination of 250 Symbol-Years</i>	\$17.00
PICK 500 DISCOUNT <i>Symbol-Year Discount for Purchasing any Combination of 500 Symbol-Years</i>	\$16.00
UPDATES TO COMPLETE DATABASE <i>Daily Updates For One Year</i>	\$10,080.00
UPDATES PER SYMBOL <i>Daily Updates For One Symbol For One Year</i>	\$20.00
MINIMUM ORDER	\$200.00

Praslydimas

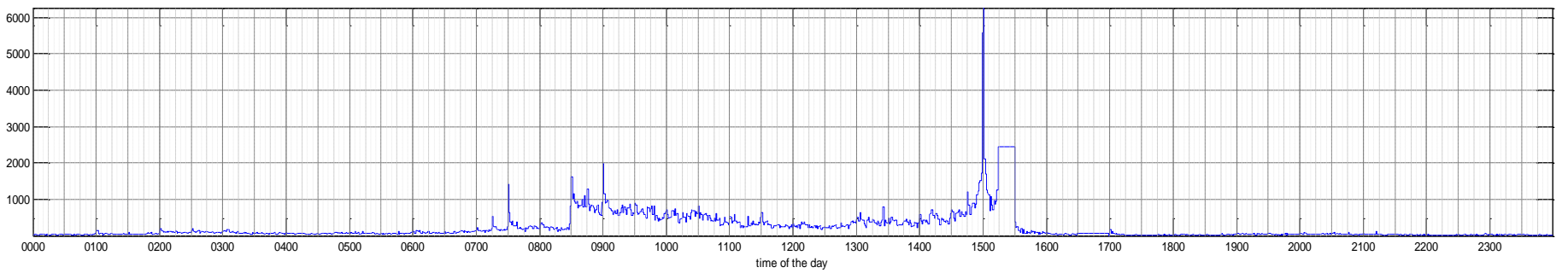
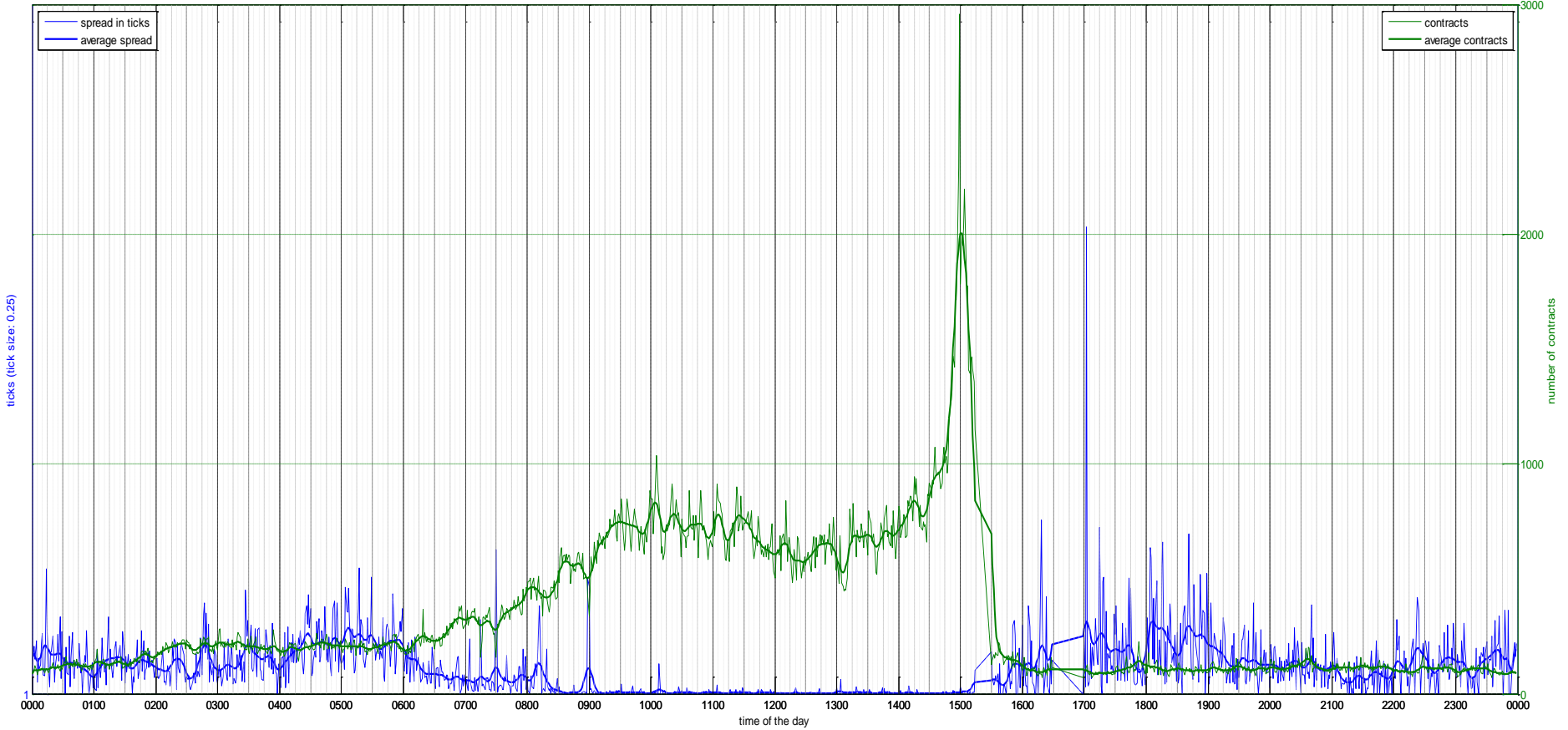
- Matoma kaina ir reali pirkimo/pardavimo kaina skiriasi
- Praslydimas skiriasi dienos bėgyje
- Praslydimas priklauso nuo rinkos kintamumo
- Paprastai simuliacijoje naudojama $\frac{1}{2}$ bid/ask spreado
- Kai kurios sistemos leidžia naudoti bid/ask duomenis simuliacijai
- Geriausia yra nustatyti realistišką praslydimą – nei per daug optimistinį, nei per daug pesimistinį
- Praslydimas susideda iš bid/ask spreado, vėlavimo ir sandorio dydžio

Open P/...	Orders	Bid Size	Price	Ask Size	Vol Bars	Vol
			67.67	200		581
			67.66			900
			67.65			500
			67.64			500
			67.63			600
			67.62			200
			67.61			100
			67.60			900
			67.59	100		500
			67.58	600 (5)		
			67.57			
			67.56			100
			67.55			100
			67.54			
			67.53			
			100 67.52			700
		200	67.51			400
			67.50			
			67.49			
			67.48			
			67.47			
		100	67.46			
		300 (3)	67.45			
		100	67.44			
			67.43			100
			67.42			
		100	67.41			
			67.40			
			67.39			
			67.38			
		200	67.37			
			67.36			

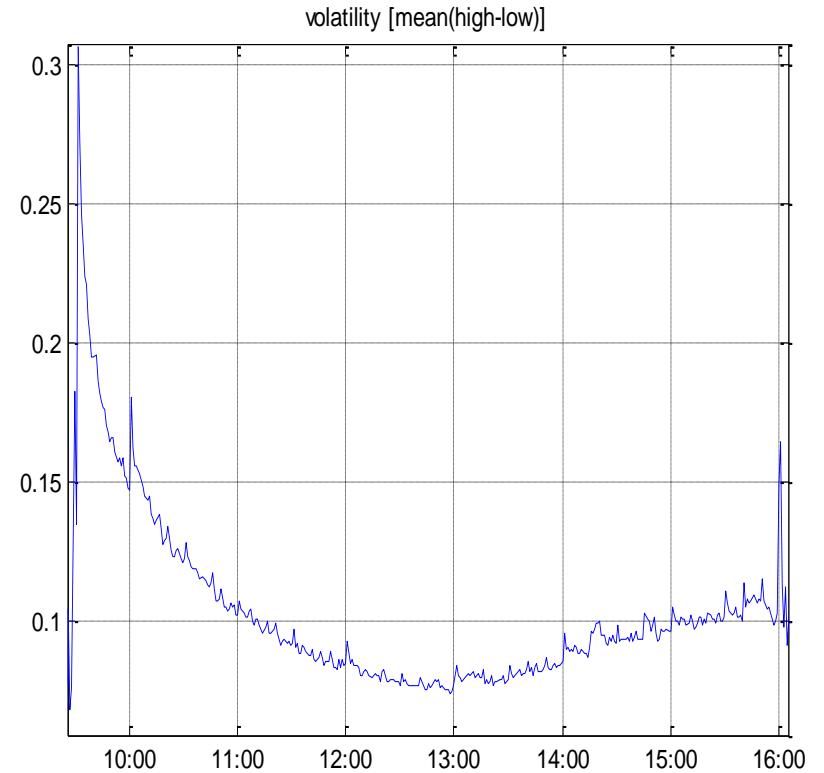
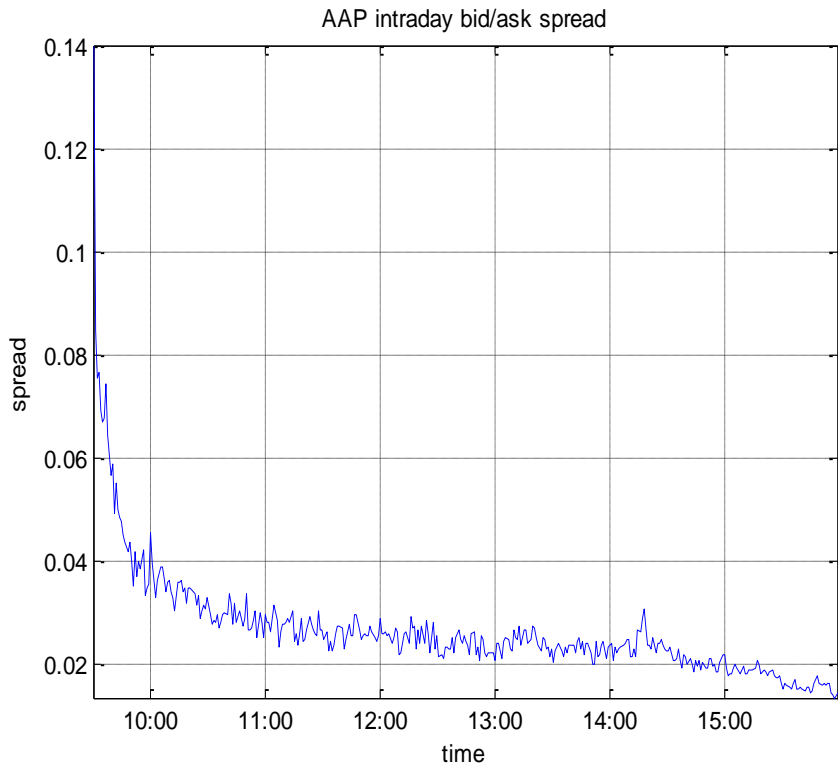


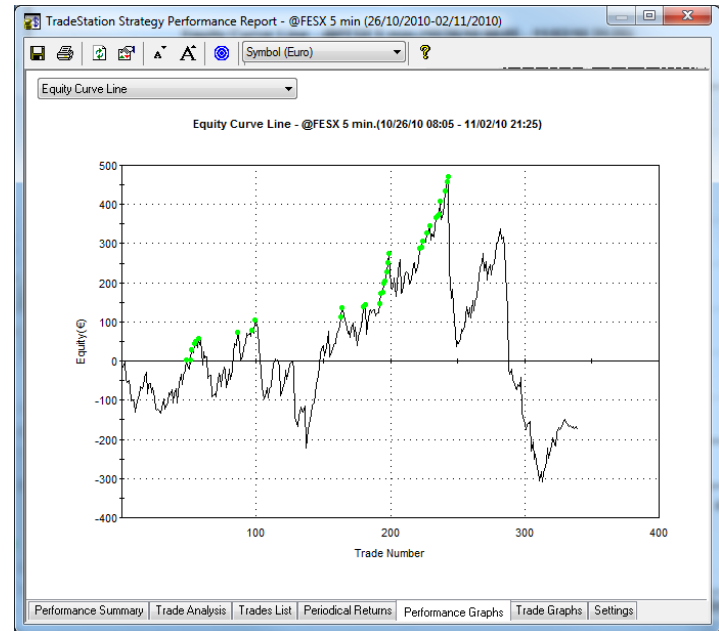
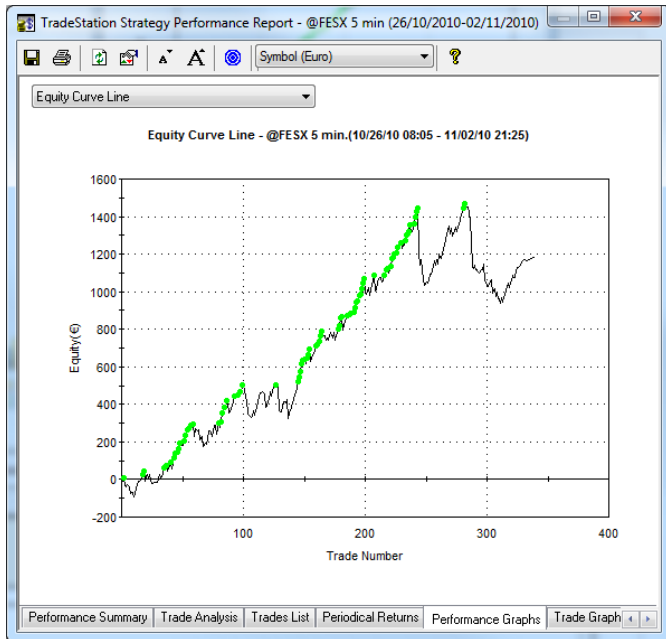
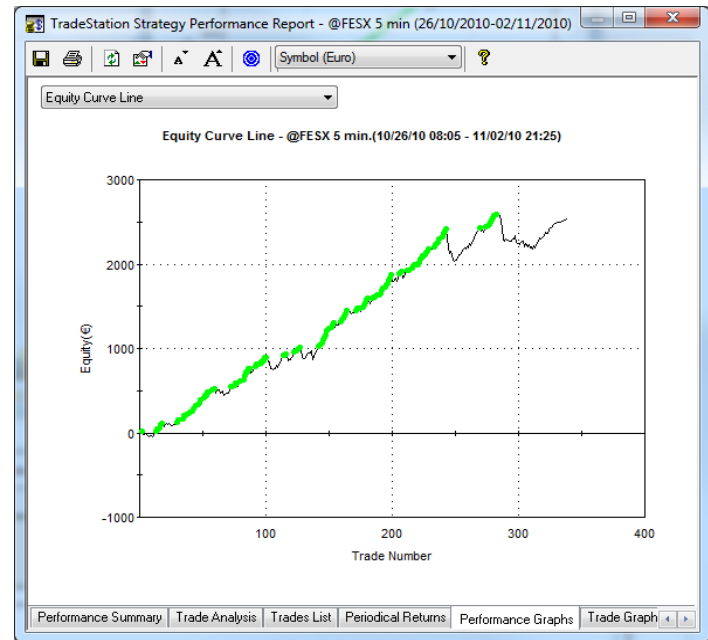
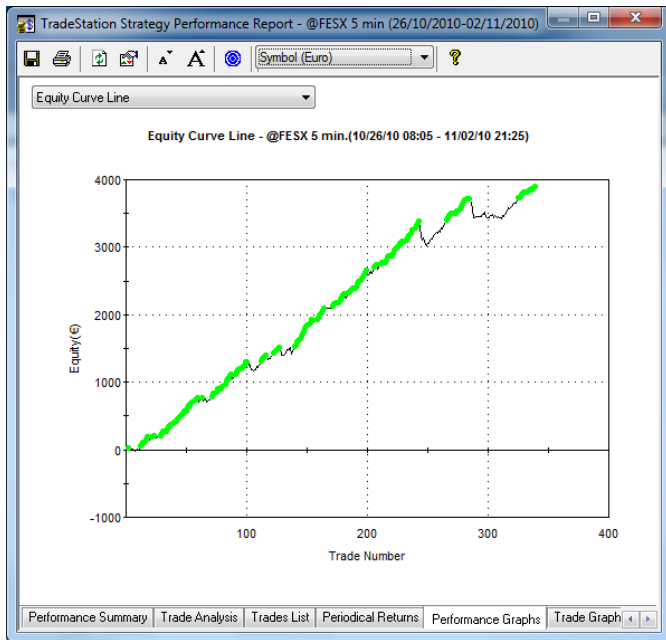


average 1min bid/ask spread on: @ES, period:03-Sep-2010 15:15:00 - 21-Oct-2010 07:35:15



Praslydimas vs kintamumas

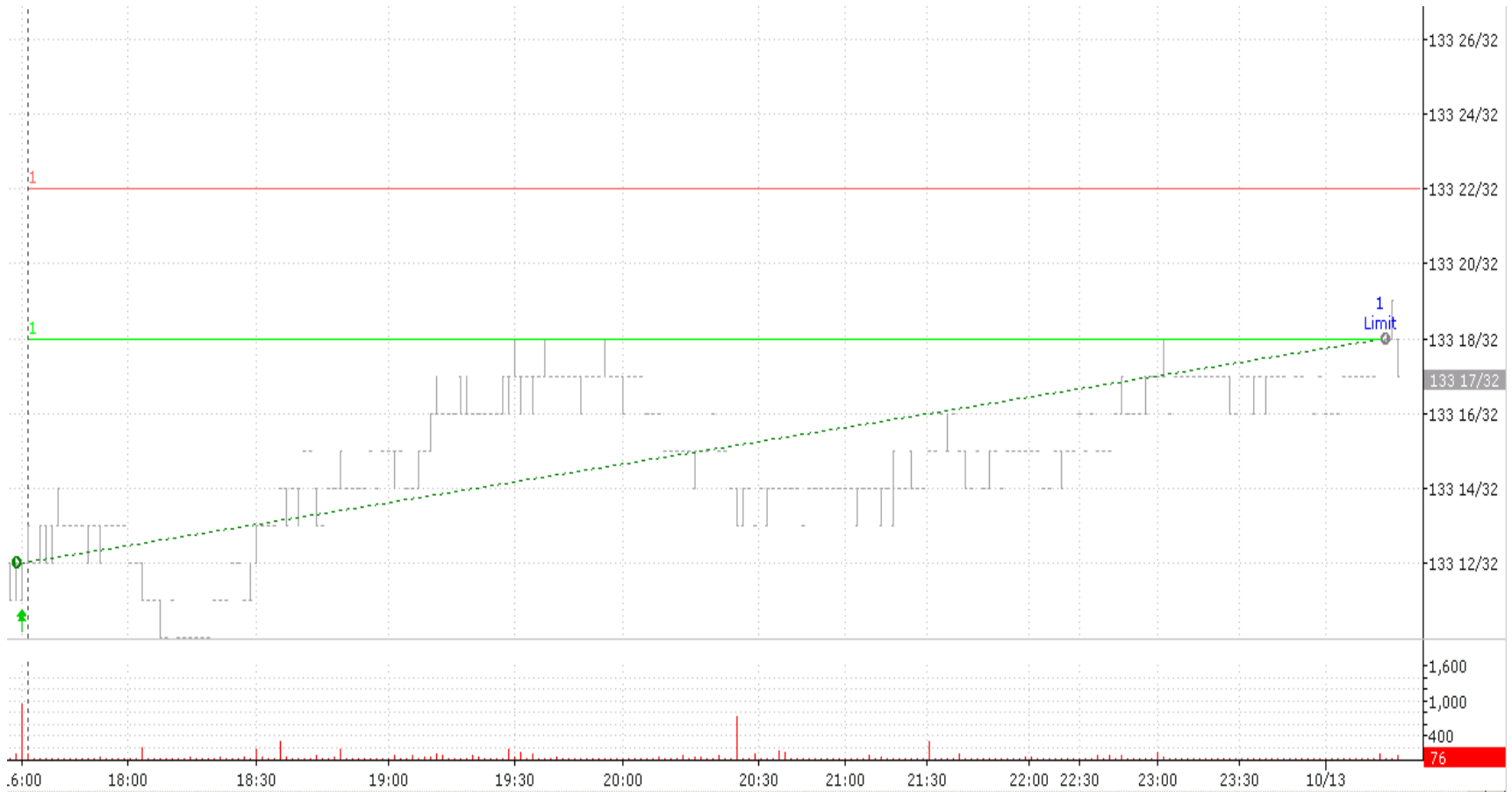




Paliesti ar dalinai įvykdyti sandoriai

- Kartais rinka tik paliečia “limit” sandorio kainą, bet jo neįvykdo
- Arba įvyksta dalinis įvykdymas (partial fill)
- Dažnai taip atsitinka neaktyviomis nakties valandomis
- Arba kai “bid/ask spread” yra didelis
- Arba kai sandoris yra didelis
- Arba kai nelikvidus instrumentas

Palietimo iliustracija



Sprendimai ir pasekmės

- Naudoti rinkos pavedimus (Market orders)
- Jei paliečia, tai po x sekundžių paversti “limit” sandorį į “market” sandorį
- Laukti iki intervalo (pvz. dienos) pabaigos ir tuomet uždaryti
- Dažniausiai praslydimas būna didesnis nei numatyta simuliacijoje

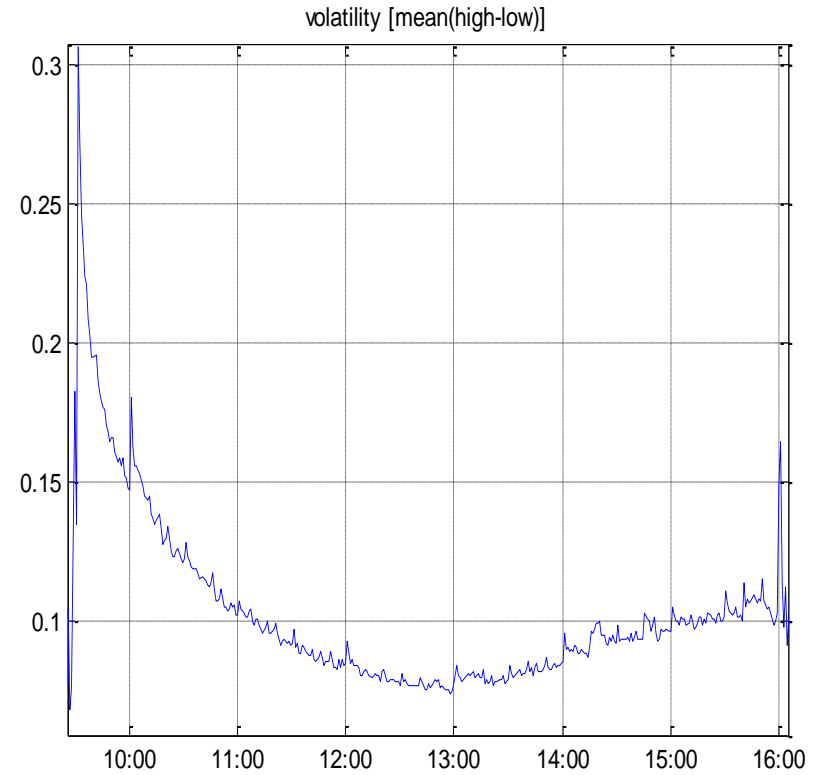
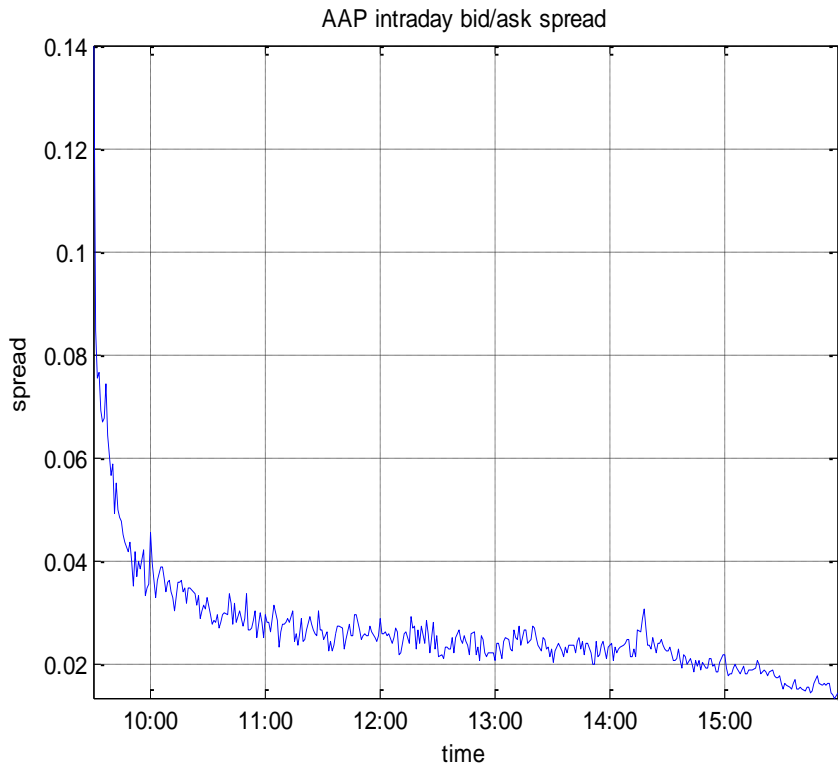
PVZ tarpo ir partial

Time	Action	Message	Route	Order#
10/25/10 05:00:02 PM	<Received>	Buy 2 EMDZ10 @ 832.6000 Limit		2-4238-7801
10/25/10 05:00:02 PM	<Sent>	Buy 2 EMDZ10 @ 832.60 Limit		2-4238-7801
10/25/10 05:00:01 PM	<Filled>	Sold 57 FDX @ 89.9800 Limit - Filled @ 89.9800	Intelligent	2-4232-6329
10/25/10 04:56:03 PM	<Filled>	Sold 72 PDCO @ 28.1700 Limit - Filled @ 28.1700	Intelligent	2-4197-1481
10/25/10 04:50:00 PM	<Received>	Buy 2 TFZ10 @ 710.7000 Limit		2-4238-2739
10/25/10 04:50:01 PM	<Sent>	Buy 2 TFZ10 @ 710.70 Limit		2-4238-2739
10/25/10 04:48:00 PM	<Filled>	Sold 133 FE @ 37.8900 Limit - Filled @ 37.8900	Intelligent	2-4232-6338
10/25/10 04:44:26 PM	<Filled>	Sold 138 HCP @ 36.8000 Limit - Filled @ 36.8000	Intelligent	2-4232-6317
10/25/10 04:44:26 PM	<Partially Filled/Alive>	Sold 100 HCP @36.8000 on 138 - 36.8000 Limit LEAVES 38	Intelligent	2-4232-6317
10/25/10 04:41:04 PM	<Filled>	Sold 134 HTLD @ 15.0800 Limit - Filled @ 15.0800	Intelligent	2-4197-1477
10/25/10 04:41:04 PM	<Partially Filled/Alive>	Sold 100 HTLD @15.0800 on 134 - 15.0800 Limit LEAVES 34	Intelligent	2-4197-1477
10/25/10 04:38:05 PM	<Filled>	Sold 330 TNE @ 15.2800 Limit - Filled @ 15.2800	Intelligent	2-4232-6327
10/25/10 04:34:23 PM	<Filled>	Sold 40 FLR @ 50.3400 Limit - Filled @ 50.3400	Intelligent	2-4155-8919
10/25/10 04:33:42 PM	<Filled>	Sold 75 PXP @ 27.4200 Limit - Filled @ 27.4200	Intelligent	2-4197-1475
10/25/10 04:32:54 PM	<Filled>	Sold 49 GSK @ 40.7500 Limit - Filled @ 40.7500	Intelligent	2-4217-1610
10/25/10 04:31:00 PM	<Filled>	Sold 2 ESZ10 @ Market - Filled @ 1186.5000		2-4236-9288
10/25/10 04:31:00 PM	<Received>	Sell 2 ESZ10 @ Market		2-4236-9288
10/25/10 04:31:00 PM	<Sent>	Sell 2 ESZ10 @ Market		2-4236-9288
10/25/10 04:30:39 PM	<Filled>	Sold 146 LPNT @ 34.8500 Limit - Filled @ 34.8595	Intelligent	2-4232-6334
10/25/10 04:30:06 PM	<Filled>	Sold 279 UBS @ 18.0200 Limit - Filled @ 18.1700	Intelligent	2-4232-6339
10/25/10 04:30:02 PM	<Partially Filled/Alive>	Sold 100 LPNT @34.8500 on 146 - 34.8500 Limit LEAVES 46	Intelligent	2-4232-6334
10/25/10 04:30:01 PM	<Filled>	Sold 138 JBHT @ 36.2800 Limit - Filled @ 36.3800	Intelligent	2-4232-6324
10/25/10 04:30:01 PM	<Filled>	Sold 53 GOLD @ 95.3900 Limit - Filled @ 96.3700	Intelligent	2-4232-6326
10/25/10 04:30:01 PM	<Received>	Buy 1 ESZ10 @ 1179.0000 Limit		2-4236-7678

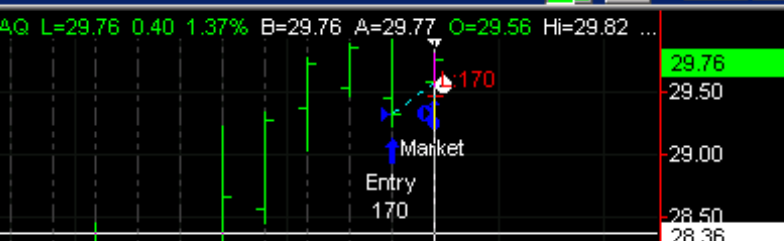
Atsidarymas su tarpu

- Kartais rinka atsidaro geresne kaina, negu buvo jūsų “limit” sandoris
- Tokiu atveju teoriškai turėtumėte gauti tokią kainą, kokia buvo rinkos atsidarymo metu
- Deja, toks sandoris yra kaip ir “market” sandoris ir, esant dideliame ryto praslydimui, gauni blogesnę kainą.

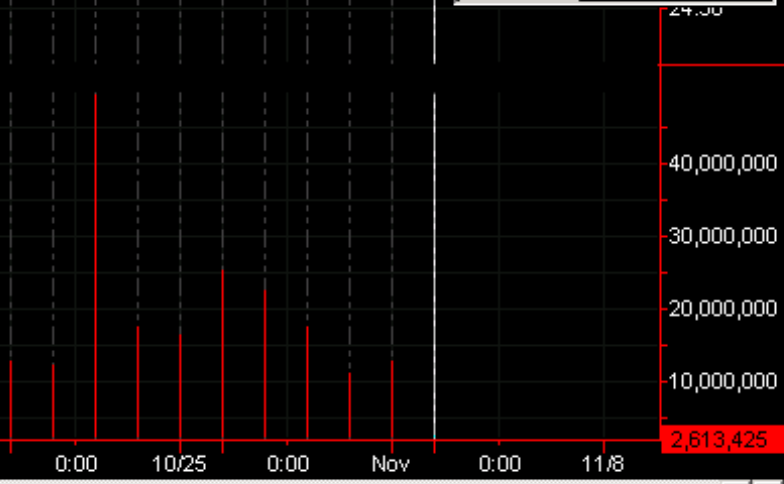
Praslydimas v.s. kintamumas



Analysis - EBAY 1440 min [NASDAQ] Ebay Inc



EBAY	
Date	11/02/10
Time	15:59
Price	28.36
Open	29.58
High	29.82
Low	29.56
Close	29.76
Up Vol	1,300,865
Down Vol	1,312,560
Strategy	Sell 170 @ 29.58
Trades	Buy 170 @ 29.32
	Sell 170 @ 29.56



TradeStation Chart Analysis - EBAY 1 min [NASDAQ] Ebay Inc



TradeStation Chart Analysis - EBAY 10 min [NASDAQ] Ebay Inc





JBHT - 1 min NASDAQ L=36.54 0.40 1.09% B=36.52 A=36.54 O=36.49 Hi=36.81 Lo=36.38 V=414,419



LPNT - 1 Tick Bar NASDAQ L=34.74 0.06 0.17% B=34.73 A=34.75 O=34.86 Hi=35.19 Lo=34.70 V=89,871



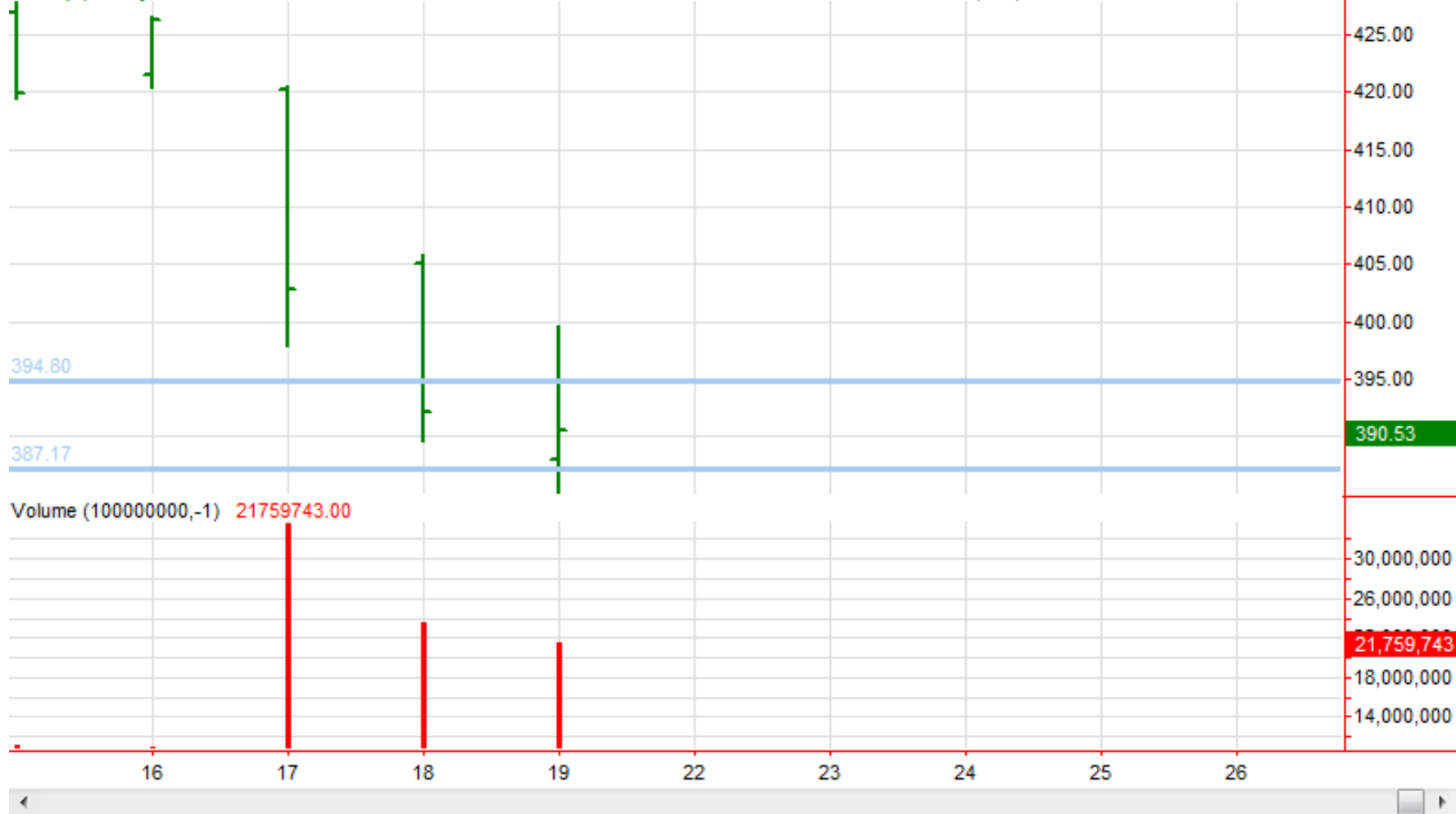
Rinkos uždarymo problema

- Kartais sistema leidžia pirkti rinkos uždarymo kaina - “close”
- Deja, rinka jau gali būti užsidariusi
- Sprendimai
 - Pirkti uždarymo aukciono metu nežinoma kaina
 - Nedaryti tokių sandorių
 - Sutrumpinti prekybos sesiją (pvz. 1 min)

Dviejų sandorių problema

- Jeigu išstatai abu - pirkimo ir pardavimo sandorius rytojui, o baras dengia juos abu
- Kaip žinoti, kuris buvo pirmas
- Galima naudoti “look inside bar” sistemą, deja, labai sulėtėja simuliacija (tik – labiausiai, x-min bar mažiau)
- Galima išstatyti pirkimo ir pardavimo sandorius 2 kartus

AAPL(D) - Daily NASDAQ L=390.10 -1.95 -0.50% B=0.00 A=0.00 O=387.97 Hi=399.60 Lo=385.10 V=21,759,743



PVZ

- Išstatom pozicijai “take profit” sandorį
- Išstatom pozicijai “stop loss” sandorį

- Kita diena rinka būna labai aktyvi ir baras dengia abu sandorius
- Klausimas: kuris pirmas buvo įvykdytas ?

Pabaiga